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JOURNAL

OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

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ASSISTED BY A PUBLISHING COMMITTEE, CONSISTING OF

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VOLUME V.

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PREFACE.

IN terminating the fifth volume of the Journal of the Philadelphia College of Pharmacy, we gladly avail ourselves of the opportunity to make a few observations on the subject of the work itself, and the difficulties which have been overcome in presenting it to its patrons at the stated periods. Without arrogating to ourselves any praise, we would draw attention to the visible improvement that has gradually taken place in its contents; as besides a great increase in the number and value of original articles, it presents an abstract of most of the interesting matter contained in the foreign journals, which is in any way connected with pharmaceutical science, and we can confidently assert that it affords more valuable chemical information than is to be met with in any other periodical work in this country.

The difficulties attendant on its publication have been of the most discouraging nature, as besides the want of punctuality in too many of the subscribers, the publication committee have experienced the greatest unwillingness on the part of the pharmaceutical profession to benefit others by a communication of the results of their observation and experience. In fact, the existence of the Journal has depended in a great measure on the personal exertions of the committee, and it will be perceived on a reference to its pages, that for a majority of the original articles we have been indebted to distinguished individuals, not enrolled in our ranks.

The great object has been to render the Journal, an eminently practical work, but this it has been impossible to ac-

comply, deprived as it has been of the aid of those from whom alone the materials for this purpose are to be obtained. It is hoped, however, that this will not in future be the case, and that the members of the College, and others engaged in pharmaceutical pursuits will enable the committee of publication to render the work under their charge, still more worthy of patronage.

In conclusion ; we would draw the attention of our readers to the proposal made by our learned contributor Mr. H. D. Rogers, to analyse the mineral waters of the United States, and to publish the results of his examination in this Journal. Any specimens of mineral water transmitted to the editor, will be handed to Mr. Rogers for this purpose ; and we would suggest to our correspondents that a short account of the spring from whence the water is taken would add much to the interest and value of their communications.

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JOURNAL

OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

APRIL 1833.

ORIGINAL COMMUNICATIONS.

ART. I.—*On the preparation of Magnesia and its Salts from Magnesite.* By E. DURAND.

THE following account of the method of preparing Magnesia from those mineral substances, into whose composition it enters in large proportions, is drawn up from notes which were kindly furnished to me, some years since, by Mr. Lacrotaz, an eminent manufacturer.

By far the greatest portion of the magnesian preparations, now used in this country, are the products of native skill and industry, a very small quantity being derived from foreign sources. These preparations are obtained from two different sources, and by dissimilar processes, well deserving the attention of the pharmacist. One portion, is afforded by the brine of the large salt works of Massachusetts, but the greatest quantity is produced at the Baltimore chemical works, from a peculiar mineral, very common in many of the serpentine formations of the United States.

In one of the late numbers of this Journal, our worthy president, D. B. Smith, has given an elaborate account of the preparation of the sulphates of Soda and Magnesia at the salt works in Massachusetts, with a rationale of the causes of the

variation in the products of the brine, according as the temperature of the atmosphere is either moderate, or below the freezing point.

The Magnesian products of the Baltimore works are obtained, as above stated, from a mineral very common in many parts of the United States; that employed in these works is found in Hartford county, Maryland, and in Lancaster county, Pennsylvania. This mineral, which is known by the name of magnesite, is considered as a hydrosilicate of magnesia, and contains from thirty-five to forty per cent of magnesia, combined with hydrosilicic acid, oxide of iron, lime, and frequently a small proportion of oxide of chrome, to which the light green colour peculiar to the magnesite, may be attributed; from this magnesite, Epsom salts are prepared in the following manner.

Sulphate of Magnesia.—After grinding the mineral by means of a vertical or horizontal mill-stone, 1000 parts of the powder are treated with 1750 or 1390 parts of sulphuric acid, taken directly from the leaden chambers. These proportions, which depend upon the strength of the acid, according as it is of 30° or 36° of Baumé's areometer for acids, represent about 508 of dry sulphuric acid.

The quantity of acid employed must always correspond with the richness of the magnesite operated on; which should be ascertained by a previous analysis of a small portion of the mineral. As, according to Gay-Lussac, the sulphate of magnesia is composed of two proportions of acid to one of base; when the magnesian earth contains 36 per cent of pure magnesia, 720 parts of acid might be employed instead of 508; but then a larger quantity of oxide of iron would be dissolved, and the reaction would take place much more slowly. It is therefore preferable, as the value of the mineral is trifling, to lose a small quantity of the latter, by using it in excess, rather than to run the risk of having too much acid, and a greater quantity of iron dissolved.

When the relative proportions of sulphuric acid and magnesite are ascertained, the former is first heated in a leaden boiler, provided on one of the sides with an aperture of about

four inches in diameter, perfectly closed with a bung covered with linen rags. The boiler must be large enough to contain three times the quantity of acid employed in the operation, on account of the great effervescence which takes place on adding the magnesite, which is thrown in, by portions of thirty or forty pounds at once, as soon as the acid has acquired the temperature of 212° . It is necessary to stir the mixture incessantly, and to maintain this degree of heat during all the time. The temperature is then increased until the liquid boils, and the ebullition is carried on for ten or fifteen minutes. The bung is now removed and the solution which has the consistence of a light jelly, is received on a brick pavement, surrounded with strong boards, calculated to prevent its spreading farther. It soon coagulates in a mass and becomes hard on cooling. This mass must possess the bitterness peculiar to Epsom salts, without any acid taste; otherwise, it would be an indication that the whole reaction has not taken place, or that the proportion of acid was too great. It is prudent to ascertain this point before emptying the boiler, in order to avoid this disappointment, by protracting the reaction, or adding a new proportion of magnesite.

This mass, which contains sulphate of magnesia, more or less sulphate of iron, and a very small quantity of sulphate of lime, silica &c., is broken to pieces, and introduced into a large reverberatory furnace, and there heated until it ceases to evolve vapours; the mass is then red hot. In the beginning of the calcination, the fire must not be strong enough to melt the saline mass, but only sufficient to make it soft and dry it. It swells considerably, and all the water is soon driven off; when it appears perfectly dry, the heat is increased to redden the furnace. A spongy and light mass of a brick colour* is thus obtained, which, being removed from the furnace, is succeeded by a new portion of the saline mass. A single man may perform from ten to twelve calcinations in twenty-four hours.

This operation is intended to liberate the sulphate of mag-

* This colour is owing to the oxidation of iron.

nesia from a part of the sulphate of iron contained in the mass. Indeed the latter salt is decomposed at a high temperature, and converted into sulphuric and sulphurous acids, which are volatilized, and into oxide of iron. Sulphurous acid is generated by the partial decomposition of the sulphuric acid, which yields to the protoxide of iron a portion of its oxygen, and transforms it into peroxide, by which the whole mass is tinged of a brick colour.

When the mass has become cold, it is thrown into a large tub, half filled with hot water, and there agitated with a large rake, moved by two men, or a stirrer, in order to accelerate the solution of the sulphate of magnesia. As soon as this is accomplished, a solution of sulphuret of lime, 20° of Baumé's areometer for salts, is added to it, by degrees, until it ceases to produce a black precipitate in a small quantity of the filtered saline liquor. The addition of the sulphuret is suspended as soon as the precipitate becomes of a light gray colour. The use of the sulphuret of lime is intended to throw down a new portion of iron; the lime of the sulphuret unites with the acid of the sulphate, forms an insoluble salt, (sulphate of lime,) and the iron is converted into protosulphuret of iron. By adding a larger quantity of sulphuret of lime than is necessary to decompose the sulphate of iron, the sulphate of magnesia would also be decomposed.

The liquor, after having settled, is decanted still warm into large iron kettles, presenting a considerable surface, in order to accelerate the evaporation, which is continued until a pelticle forms at the surface. It is then removed into large leaden crystallizing vessels, where the salt crystallizes on cooling. The mother waters are evaporated to afford a new crop of crystals.

The sulphate of magnesia of the first crystallization, is seldom sufficiently pure to be introduced into the market; it retains, besides a small quantity of sulphate of iron, some impurities which remain suspended in the solution. It therefore becomes necessary to purify it, and this operation is thus performed. The salt, well drained of its mother water, is

removed into a large leaden kettle, heated by steam,* and containing warm water. When saturation is completed, a solution of chloride of oxide of calcium is poured in it, until a small quantity of the filtered liquor ceases to afford any more red precipitate. The greatest care must be taken not to go beyond this point, because the sulphate of magnesia would itself be decomposed. The separation of the sulphate of iron by the chloride of lime, is founded upon the greater affinity of sulphuric acid for lime, which it precipitates from all its solutions, in the state of an insoluble sulphate. The small quantity of sulphate of iron remaining in solution is entirely decomposed, its acid unites with the lime of the chloride; the protoxide of the sulphate of iron is converted into peroxide, by the decomposition of the water by the chloride, which takes up its hydrogen to form hydrochloric acid; and the sulphuric acid having more affinity for the alkaline or earthy metallic oxides, than for those which are not so, the sulphate of iron is entirely decomposed, before that of the magnesia could be acted upon; however, should the chloride be added in excess, the latter sulphate would likewise be decomposed, by the greater affinity of its acid for lime; an insoluble sulphate of lime would be the consequence; even some hydrochlorate of magnesia would be produced by the decomposition of the chloride by water, if the mixture should remain in contact for several days.

When the due quantity of chloride of oxide of calcium has been added to the boiling solution of sulphate of magnesia, the kettle is covered in order to maintain the temperature of the liquid until it has become perfectly clear. The solution is then removed into the crystallizing leaden vessels and left to crystallize. The acicular crystals are drained of the mother water, carried to a drying room, and afterwards sifted and put in barrels. The large crystals coating the sides of the

* The most convenient apparatus consists of a large wooden case sheathed with lead, in which steam is transmitted through a tube plunging in it, and the temperature raised to the boiling point. This box must be sufficiently elevated to permit the liquid to run into the crystallizing vessels.

crystallizing vessels, are redissolved to obtain acicular crystals, and the mother waters evaporated as long as they furnish a sufficiency of crystals.

REMARKS.

The saturation of the magnesia contained in the magnesite, would probably be more prompt and complete, if, as in well directed alum manufactories, the mineral were calcined before hand, in order to deprive it of all its moisture. The calcination might even be carried to redness, without running the risk incurred with the aluminous earth, of being rendered insoluble in the acids. This operation would separate a great part of the iron, which would be converted into the state of peroxide, by the decomposition of the water at a high temperature. The mixture removed from the first kettle, might be received directly into the lixiviating tub containing warm water, and thus, all the labour and fuel necessary to dry the hardened jelly (which is the most unpleasant part of the operation) would be saved, and a larger product obtained; for although the Epsom salt may withstand a very high temperature, there is always a small quantity of it decomposed. The iron should be separated by the means already indicated, by lime water, by the scrapings of the lumps of the carbonated magnesia, by the magnesia in jelly, or by any other means.

The sulphate of magnesia is generally dried in warm and well closed rooms, in which the temperature is raised to a degree sufficient to cause the salt to agglomerate and slightly effloresce. Its exterior appearance is sometimes dull, and deprived of the pearly brilliancy so much desired in commerce. This is very bad management; it is not heat alone which desiccates; it only vaporizes the water, which the air would dissolve and carry off if a current were established; but it can escape only by the fissures of the doors and windows; or a long time and much fuel will be required to raise the temperature to a degree capable of rarifying the air sufficiently to force a passage. These inconveniences would be removed by drying rooms, furnished with a current of heated air; thus a great economy of time and fuel would be afforded, and better products obtained.

There is another sulphate of magnesia in commerce, which is obtained from the bittern of the salt works. This article is seldom pure; all that I have seen, contains more or less hydrochlorate of magnesia, and sometimes in sufficient quantity to render it deliquescent in the air. It is astonishing that the manufacturers have not yet discovered the means of rendering this salt as pure as that made in a direct way, which might be done without any great difficulty.

Principal characters of good Sulphate of Magnesia.—It ought to be white, perfectly dry to the touch; not deliquescent in the air; acquiring a dull whiteness, but without efflorescing after long exposure in the atmosphere; when concentrated sulphuric acid is poured upon it, and the mixture slightly heated, it ought not to evolve hydrochloric acid gas: chloride of oxide of calcium precipitates it in a white powder, but pure bi-carbonate of soda ought not to form any precipitate.

	Water.	Temperature.	Quant. salt dissolved.
Solubility of Sulphate of Magnesia. (Henry and Guibourt.)	100 parts	58.25°	103.69
	100 do.	120.33°	212.61
	100 do.	206.67°	644.44

Carbonate of Magnesia.—To obtain a perfectly white carbonate of magnesia, which does not redden by calcination, it is necessary to employ a sulphate of magnesia entirely free from iron; the minutest quantity of the latter would alter the colour of the magnesia, especially when calcined at a very elevated temperature.

A determinate quantity of sulphate of magnesia is added to cold water, as long as the latter will dissolve the salt: (that is about equal parts.) Should the solution contain any sulphate of iron, this must be decomposed either by chloride of lime, or by the hydrosulphate of ammonia. When the liquor has become perfectly limpid, it is decanted in a wooden tub heated by steam, and on 100 parts of Epsom salt employed, a solution of 125 parts of crystallized carbonate of soda is added. The mixture must be agitated rapidly, so as to prevent the formation of lumps, which otherwise would require a long time to divide, and an increased number of washings. The whole is heated to 170° to expel any excess of carbonic acid, by

which some magnesia is retained in solution. When the carbonate has settled to the bottom, the clear liquid is decanted and the precipitate washed two or three times in filtered tepid water, holding in solution a small quantity, say a half per cent, of potassa or soda, to precipitate the small quantity of salt of lime which it might contain, and afterwards with cold water. The two last washings, or at least the last one ought to be made with distilled water. The first waters are evaporated, and afford handsome crystals of sulphate of soda.

When the last washings do not any longer precipitate with a salt of baryta, the carbonate of magnesia is placed in large linen filters, where it is permitted to drain for twenty-four or forty-eight hours. If destined to form lump magnesia, it is placed in wooden moulds without bottoms, resting on an absorbing substance; either large bricks moderately burnt, or upon gypsum. The soft carbonate is slightly pressed with a piece of wood, or a square piece of sheet iron of the size of the mouth of the moulds, in order that they may be perfectly filled up with magnesia, and that no vacuum be left. As soon as the lumps can be removed from the moulds, they are turned upper side down, in order that the absorbing body may attract as much of the water, and as quickly as possible; and the particles of magnesia be thus prevented from aggregating together by their own weight. On the celerity of this operation, and the speedy desiccation of the lumps in the drying room, depends, in a great measure, the lightness of the carbonate of magnesia. When it is perfectly dry, every lump is presented, (each of its faces alternately,) to the surface of a metallic sieve, revolving with velocity by the same mechanism as a grinding stone, or the lathe of a turner. Thus the carbonate of magnesia is freed from all the foreign matters which may have soiled its surface during dessication, and rendered perfectly smooth. All the moulds must be of white wood and kept perfectly clean.

Calcined Magnesia.—It is useless to put the carbonate of magnesia designed for calcination into moulds. It is only removed from the filter upon which it has drained and carried to the drying room, where it is spread over frames covered

with linen and then dried quickly. In that state, it is introduced into cylindrical earthen ware pots, slightly burnt and furnished with their tops or covers well luted with clay. These pots are thus placed in the furnace of an earthen ware manufactory. In this way a magnesia perfectly deprived of its carbonic acid is obtained at a trifling expense of calcination. The same pots may be used several times.

This calcined magnesia is generally very light, and in my opinion, highly preferable for therapeutical exhibition to Henry's magnesia. It dissolves very easily in the weakest acids, whereas, that of the English chemist, which is however very pure, is only soluble in a tolerably concentrated acid. It is much less absorbent, and better calculated to saturate the very feeble acids of the stomach.

M. Robiquet was not mistaken in his opinion, that the unctuousity peculiar to Henry's magnesia, was owing, in a great measure, to the high temperature to which it had been submitted; this is not, however, the only cause of this property, which depends more particularly on the nature of the subcarbonate employed for its precipitation. When the sulphate of magnesia is decomposed by the carbonate of soda, the calcined magnesia is much softer to the touch, than that afforded by the carbonate of potassa. This is easily explained: First, by the great difficulty in separating the last portions of the sulphate of potassa, resulting from the decomposition: Second, on account of the silica and alumina which are constantly contained in the carbonate of potassa, and are thrown down with the carbonate of magnesia, to which they communicate a roughness that the same article precipitated by soda has not. The purity of the sulphate of magnesia and of the water employed as solvent, contributes also to impart this property. If the former contains any muriate of lime, (chloride of calcium,) and the latter any sulphate of lime, the base of both these salts will be precipitated in the state of carbonate.

A pure magnesia, heavy, very soft to the touch, and in every respect, similar to Henry's magnesia, may be obtained by the following process:—The carbonate of magnesia, before being perfectly dry, is introduced into a square box with-

out a bottom, made with strong boards firmly joined together by iron hoops; it is pressed as much as possible with the hands, and a strong piece of board so adjusted as to enter easily in the case, is put over it, and subjected to the power of a press in order to reduce the volume of the magnesia. The square mass which has thus been produced, is placed in a crucible of refractory bricks of such capacity and form as to be exactly filled up by the lump of carbonate of magnesia; the cover is then adjusted and luted with wetted magnesia, and the whole heated to white heat. A lump of thirty or forty pounds requires at least eight hours of calcination. When the calcined magnesia is sufficiently cooled, it is sifted through a fine sieve.

If the crucible contains no or very little metallic oxide, the product will be perfectly white, heavy, very soft and unctuous to the touch, mixing well with water on account of its specific gravity which is ten times greater than that of the calcined magnesia prepared without being pressed and at a lower temperature. It is sparingly soluble in the weak acids, and in every respect similar to that so much extolled, of the English chemist. A product nearly similar is obtained, by pressing as much as possible the carbonate of magnesia in earthen pots, without the aid of the press.

The colour of the calcined magnesia depends very much on the purity of the earth employed in the manufacture of the crucibles; if they, or even their covers, contain any oxide of iron, the magnesia, however pure it may be, will be penetrated even to the centre of the mass by a very small quantity of that oxide, but this quantity will be sufficient to communicate to it a light pink appearance. This tint will sometimes be perceptible even in the third calcination. It would, consequently, be advantageous, when this process is to be performed on a large scale, and the operator wishes to obtain a fine article, to procure crucibles or bricks containing neither iron nor manganese.

ART. II.—*Process for preparing Gallic Acid.* By DAVID STEWART, of Baltimore.

HAVING been for some time engaged in the preparation of Gallic Acid, and being successful beyond my expectations in preparing and purifying that article, I have been induced to make public the processes which I have selected for so doing, hoping that some one may benefit by an experience which has cost me some trouble and research. On the 15th of October, I infused four pounds of coarsely powdered gall nut in about two gallons of cold water, stirred the mixture at intervals until the 20th, when the dregs were separated from the infusion by a cloth. These dregs were macerated in four pints of water, separated from the infusion thus formed, and pressed. The liquids when mixed were suffered to fine, decanted from the sediment, and set aside in a glass jar covered with paper. On the 21st of December, (nearly two months having elapsed,) a quantity of impure gallic acid had crystallized throughout this infusion, which, when separated from the mother water by a cloth and dried, weighed 7 oz. As the temperature to which the infusion had been exposed would not have averaged much more than 40°, I again set it aside, and toward the expiration of two months obtained 7½ oz. more of the acid, which added to the former product amounted to 14½ oz.

To free this from the elagic acid and other insoluble matter with which it precipitates, it should be powdered and thrown into about four times its weight of boiling water. To effect the solution of all the gallic acid, the mixture should boil for a few moments, and then be filtered while at the boiling temperature. When the filtered liquid has cooled, it will deposite the gallic acid in yellowish white crystals. To free these from colouring matter, it is necessary to separate them from the mother water, by pressure in a cloth, and throw them into eight times their weight of boiling water, with one fifth their weight of animal charcoal, (purified by muriatic acid.) This mixture, when boiled and filtered as the former one, will afford a much more colourless solution, which, upon cooling, will concrete into a mass of white crystals of gallic acid.

Gallic acid when obtained by this last process is nearly pure, and it may be freed from the tannin which still adheres to it by sublimation, but, as it is so easily decomposed by heat, this will be found a very tedious and difficult process; moreover, when sublimed, gallic acid is found to possess different properties from the unsublimed acid. A knowledge of these facts led me to adopt another means of purifying this acid, which is at once easy and expeditious.

The crystals obtained by this last mentioned process were powdered, and separated from their water of crystallization by a carefully regulated temperature. The powder was then thrown into boiling alcohol, (at 40° Baumé.) This mixture was suffered to boil for a few minutes, and then filtered while boiling hot. The alcohol, which I used, was rendered strong by means of a bladder. The quantity of alcohol used should not exceed double the weight of the acid to be operated on. It is also necessary that the alcohol be anhydrous, for when in this state it does not dissolve the tannin, but that substance is rendered soluble in it by a very minute quantity of water. I would also suggest that the alcoholic solution should be filtered immediately, into four times its bulk of boiling water, as it does not crystallize so regularly from the alcoholic solution, being destitute of water of crystallization.

By a careful evaporation of the mother waters, fresh crops of crystals may be obtained, which should be purified as the former products. The crystals, particularly from the last process, should be excluded from the light while drying.

ART. III.—*On the Alum and Copperas Manufactory of Cape Sable, Maryland.* By E. DURAND.

WE extract the following account of the Alum and Copperas Manufactory, formerly conducted by Dr. G. Troost, at Cape Sable, Maryland, from a letter of our associate Mr. E. Durand, written to a friend of his in 1817:—

These works are situated on a cape of the Chesapeake Bay,

at the mouth of Magothy river, about twenty miles from Baltimore and six from Annapolis. The soil is alluvial, sandy and unfit for cultivation. The trees about the establishment are principally of the fir tribe; but there are, however, in the neighbourhood, tracts covered with different species of oak, some chestnut and tulip trees of immense size. All the springs are more or less impregnated with sulphates of iron and alumine.

The works at this time of the year (month of May) being in full operation, and having had for these two months past the opportunity of witnessing all the processes, I will attempt to give you a description, first, of the materials from which alum and copperas are obtained, and, afterwards, of the different operations to which these materials are submitted before the products can be introduced into commerce.

Under a stratum of sand, and resting upon an impermeable crust of ferruginous sand stone, lies, imbedded in a layer of almost pure alumine about six feet thick, a forest of pine trees, thrown down by some ancient convulsion, and which has apparently remained for centuries under water. The crust, which forms the base of this aluminous layer, is a little below the level of low tides and is of considerable hardness; the labourers take good care not to break it, otherwise the water gushes out and inundates the works. This remarkable formation extends to a considerable distance.

The pines imbedded, seem to belong to the same species that now cover the soil, and are converted into lignites, more or less impregnated with sulphuret of iron. All the pieces which I have examined present this singular phenomenon: The central parts are generally transformed into pure metallic sulphuret, sometimes exhibiting in the hollow parts beautiful octohedral crystals of a yellowish metallic lustre and great hardness. The more remote the ligneous layers from the centre, the less they are saturated with sulphuret of iron. The external rays, as well as the cortical layers, are generally pure lignitè, some compact and black, others retaining the colour and friability of rotten wood. In some instances, their texture seems to have suffered but little alteration; the central

system, concentric rays, the bark and knots being perfectly discernible; even fruits are occasionally found in a pretty good state of preservation as to form.

About fifty slaves are employed in these works; some in digging the materials, others in carrying them to the sea shore, where they are piled up in large heaps, with intermediate layers of wood, afterwards to be burnt. Another set of men transport the ashes afforded by previous combustions, to the lixiviating hoppers, whilst a few of the most intelligent are employed in the laboratory, under the superintendence of an overseer.

The lignites and aluminous earths being piled up together with alternate layers of wood, as aforesaid, a fire is kindled in different parts of the mass, and the whole is suffered to undergo a slow combustion. The pyrites are decomposed, and sulphuric acid formed, which, coming in contact with the alumine and the ashes of the wood, forms a double sulphate; but at the same time, a much larger quantity of simple sulphate of alumine, and some protosulphate of iron are produced. This latter salt, however, is nearly all decomposed during the process of combustion, giving rise to a new production of sulphuric acid, and consequently, to more sulphate of alumine. The protoxide of iron is thus transformed into insoluble peroxide. The combustion lasts for months, during which period such a quantity of sulphurous vapours are lost in the atmosphere, as to vitiate it powerfully in a compass of several miles around the establishment.

When the whole is consumed, the ashes are removed to large hoppers, and there lixiviated. When the ley is sufficiently saturated, it is transmitted to large boilers and evaporated to a certain degree; sulphate of potassa or potassa itself, in determinate proportions is then added, and the liquor carried to about thirty-six degrees of Baumé's areometer. The fire is now removed, and the solution, after being permitted to settle for a while, is transferred to the crystallizing vessels, where, on cooling, almost all the alum is deposited in an impure state. The mother liquor is added to a new quantity of ley, and the same process is repeated successively,

until all the ley obtained from the hopper is exhausted. When the mother liquor seems too highly impregnated with the salts of iron, it is thrown into the hopper to undergo decomposition under the influence of the air. The alum obtained by this process, is recrystallized two, and occasionally three times, in order to obtain it in a state of sufficient purity for commercial purposes. The quantity produced weekly is from six to eight tons.

Besides the manufactory of alum, a large quantity of sulphate of iron is also produced by a very simple, but long process. The large pyrites, undecomposed by combustion, or obtained directly from the clay, are piled up on a sloping surface, surrounded by a trench, and are thus abandoned for a considerable time to the atmospheric influence. They are slowly decomposed by the action of the air and moisture, and converted into sulphate of iron, which appears on the surface in the form of a white efflorescence. This salt is dissolved by the rain and by the water which is occasionally sprinkled over it and carried into the trench, where, by spontaneous evaporation and redissolving the efflorescence, (as it is generated,) with the solution already contained in the trench, the liquor acquires a considerable degree of concentration. In that state it is carried to the boilers, evaporated to 35° or 38° and left to crystallize.

How such an amazing quantity of sulphuret of iron accumulated in these lignites, is beyond my comprehension. What afforded its constituents; it being evident that neither the wood nor the clay in which it was imbedded contained them? Are iron and sulphur simple or compound bodies? These are all mysteries which it is not yet in the power of chemistry to solve. But however it may be, on considering attentively all that surrounds me at the present moment, I cannot help regarding them as formed of elements as yet unknown to us, which are capable of acting on each other at great distances, and of forming new and more complex combinations, under peculiar circumstances, perhaps by the agency of electricity!

Another circumstance worthy to be mentioned, as charac-

terizing this interesting deposit, is the occurrence of amber. Some pieces have been found as large as the fist; generally, however, very impure; but I have seen some pieces in Dr. Troost and my friend Mr. Julius Ducatel's collection, as beautiful and transparent as the amber of the Baltic. Nodules of amber surrounding what appears to have been the twigs of trees, have been picked up, and what is very singular, they exhibit regular perforations, bearing evidence that they are the work of an insect; in some of these, small insects of an extinct species, are even perceived. These nodules may be compared to nut galls, though generally larger.

Is amber an animo-vegetable substance, which has subsequently become mineralized under peculiar circumstances? Here is another question to be answered by chemists and mineralogists.

ART. IV.—*Remarks on the Neutral Mixture.*

By JOS. SCATTERGOOD.

No reader of this Journal, I presume, will question the great importance of uniformity in the strength of all our medicinal preparations, and that the physician who disregards this very essential point in the articles he may administer, will be continually liable to disappointments and inexplicable difficulties.

The great celebrity of the diaphoretic preparation called neutral mixture, and, consequently, the frequent applications apothecaries have for it, renders it highly important to the success of the physician, as well as the character and convenience of the apothecary, that a formula should be agreed upon, which would render it, what all admit it is not *now*, of uniform strength.

I trust no improper motive will be attributed to me if I attempt to show that this popular and highly useful article is daily prescribed by our physicians, of a diversity of strength they are not perhaps aware—in order to do which, it will

only be necessary to copy a few of the principal formulæ that most are daily compounded. The four following are those generally used:—

No. 1.—R. Succi Limonis Recentis, ℥ij.

Potassæ Carbonatis q. s. ad. saturand.

Sacch. alb. ℥ij.

Aquæ ℥ij.

No. 2.—R. Succi Limonis Recentis, ℥iv.

Potassæ Carbonatis q. s. ad. saturand.

No. 3.—The Juice of 2 Lemons.

Potassæ Carbonatis q. s. ad. saturand.

Sacch. alb. ℥ij.

Aqua, ℥ij.

No. 4.—Potassæ Carbonatis, 3iss.

Succ. Limon q. s.

Sacch. alb. ℥ss.

Aquæ from 4 to 6 oz.

The above are given in the same doses, although they all vary in strength. The second is double that of the first, the strength of the third will depend entirely on the quantity of the juice yielded by the lemons, the product of which is very uncertain, some yielding an ounce and a half, others not more than half an ounce, according to their size, age, &c. The fourth, independent of containing two or three times as much water as any of the rest, will be liable, in common with all the others, to vary with the strength of the juice, in which a difference of upwards of 20 per cent. is often observed. This *peculiarity* of the juice will always render its employment objectionable, when uniformity of strength is regarded. The resulting compound of all these formulæ is a solution of citrate of potassa, more or less diluted and mixed with the coagulable mucilaginous matter of the lemon juice, to get rid of which is always attended with more or less difficulty and inconvenience.

It would be considered strange indeed, at the present day if a physician should order the apothecary to saturate a given quantity of dilute sulphuric acid with magnesia, whenever he wished to administer a dose of Epsom salts; and yet the prac-

tice of making the neutral mixture extemporaneously is not less unscientific and useless. The citrate of potassa when crystallized, is as definite a compound as sulphate of magnesia or any other salt, and as such should certainly be used for preparing mixtures, of which it is a main constituent. Fifty grains of citrate of potassa, dissolved in one ounce of water, will be found to be about equal to one ounce of lemon juice, (of average strength,) saturated with potassa, and hence a preparation as follows may be substituted in all cases where the neutral mixture prepared with fresh lemon juice is admissible; and has the advantage over it of being *uniform* in strength, clear of *inert* matter, and readily made at any time, while it is equally agreeable to the taste.*

R. Potassæ Citras ʒv.

Loaf sugar, previously rubbed on fresh lemon peel,
or with a drop or two of ol. lemon on it, ʒss.

Water ʒvj.

If, however, notwithstanding the above considerations, this mixture is still to be extemporaneously prepared, crystallized citric acid is certainly the only thing the accurate scientific physician should employ. It is uniform in strength, is very soluble in water, and of an agreeable taste. The following formula (substituting the bi-carbonate† for carbonate of potassæ, and adding a little sugar,) given in the U. S. Dispensatory is a good one, and will be found to make a much more satisfactory mixture in every respect than any prepared with lemon juice:—

Citric acid ʒij.

Ol. limon m. i.

Potassæ bi-carb. q. s. ad saturand.

Aquæ ʒiv.

A more agreeable though rather more troublesome mode

* A few grains of citric acid, say 10 grs. to the quantity ordered above, would render it still more agreeable to many palates.

† The common salt of tartar of commerce being the only carbonate of potash generally kept in the shops, and containing impurities, the bi-carbonate is therefore preferred.

of administering the ingredients of the neutral mixture, is to dissolve them separately, so that they may be mixed at the bed side and drank during effervescence. This constitutes the well known preparation commonly called the effervescing draught. For the formation of this draught the following powders will be found a certain and convenient mode; they may be carried with more convenience, and will be found altogether more manageable than the liquids necessary to form it, particularly where lemon juice is used, this being often so weak as scarcely to decompose the carbonate of potassa. They may be kept put up as the sodaic and seidlitz powders are, with directions for their use—the acid in white, and the bi-carbonate of potassa and sugar in blue paper:—

Powdered citric acid ℞i.

Bi-carb. potassa 3ss.

Sugar, previously rubbed on lemon peel, or scented with ol. lemon 3ss.

ART. V.—*On Officinal Tinctures*, by JOSEPH BRINGHURST,
Wilmington, Delaware.

IN compliance with the requisitions of the College of Pharmacy, I have given as much attention to the subject of tinctures &c. as my health and occupations have permitted; and now present a table of tinctures and extracts, from actual experiments.

In all the trials with the tinctures, a French vial, with a long ground stopper, was used; this was filled with the tincture, the stopper pressed in, and the whole surface carefully dried before weighing. The alcohol employed was diluted to 21° Baumé, at a temperature of 65° F. The vial when empty, weighed fifteen drachms, thirty grains; when filled with the diluted alcohol, the weight was two ounces, five drachms, five grains. By comparing this with the weight of the vial when filled with the tinctures, the difference will be readily ascertained.

The extracts shew the quantity of the articles really held in

the menstruum, though whether I have been accurate in the weight of the menstruum displaced, will deserve further examination.

ARTICLES.	Quantity.	Menstruum.	Weight of vial filled with tincture.	Dry extract.	Weight added to the menstruum in tincture.	Weight of menstruum displaced by the solution of the material.
Pure Opium,	gr. 75	Alcohol diluted.	3 gr.	gr. 21	gr. 11	gr. 10
Pulv. Valerian,	3ij	"	2 5 15	9	7	2
Do.	3ij	"	2 5 12	9	5	4
Gum Guaiac.	3ij	"	2 5 10	63	19	43
Do.	3ij	36°	2 4 54	55	20	
Aloes,	3ss	diluted.	2 5 9	9	4	5
Pulv. Myrrh,	3ij	"	2 5 10	16	5	11
Do.	3ij	"	2 5 54	15		
Scillæ sic (white)	3ij	"	2 5 23	36	18	18
Cinchon flav.	3ij	"	2 5 14	18	19	18
Serpentar rad.	3iiss	"	2 5 8	3	3	no change.
Lupuline (trench)	3ij	Alcohol 36°	2 4 56	30	22	12
Digitalis,	3ij	" diluted.	2 5 12	21	7	14
Cantharis,	3i	"	2 5 9	6 $\frac{1}{2}$	4	2 $\frac{3}{4}$
Quassia,	3i	"	2 5 5	16		
Spigel rad. pulv.	3ij	*	1H.			
Pulv. Jalap,	1 $\frac{1}{2}$ lb.	†				

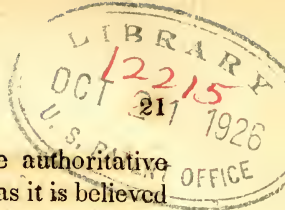
* Digested two days, in a closed bottle, at a temperature of 110° to 120°, with alcohol at 36° 3fe vi, and water 3fe xxiv.

† Alcohol diluted to 32° Baume, one and a half gallons, digested five days, at a temperature of 120°. Employing by degrees 3xii of subcarb. sod. in crystals. This yielded 3viiss extract, suitable for pills.

ART. VI.—Patent Medicines.

ONE of the earliest efforts of the College of Pharmacy was an attempt to reform the recipes for the preparation of some of the Patent Medicines in common use. The confusion

Patent Medicines.



into which these had fallen, for want of some authoritative standard, was productive of serious evils; and as it is believed that the attempt was in great measure successful, we republish the report of the committee by which the task was performed.

Proceedings of the Philadelphia College of Pharmacy, and of the Board of Trustees, on the subject of the older Patent Medicines.

At a meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held May 21st, 1822:—

Resolved, That the communication from Solomon Temple relative to Patent Medicines, which was presented at a former meeting, be read, when the following resolutions (attached to the communication) were offered and agreed to:—

1. *Resolved*, That a committee be appointed to select from such prescriptions for the preparation of Patent Medicines and other compounds, as may be submitted to them by the members of the college, those which in their opinion, may be deemed most appropriate for the different compositions, which, after having carefully compared with others to which the committee may have access, and altered in such a manner as may appear advisable, they shall submit when prepared to the Board of Trustees for their approbation, with a view of laying the result before the college for final adoption, as the standard formulæ for the use of its members.

2. *Resolved*, That the members of the college be requested to place at the disposal of the above committee, all such recipes for the preparation of Patent Medicines as they may be willing to communicate.

3. *Resolved*, That the above committee be instructed to consider whether any, and if any, what alteration or modification of the directions which accompany the Patent Medicines can with propriety be made at this time.

Solomon Temple, Daniel B. Smith, Charles Allen, Warder Morris and Dr. Samuel Jackson were appointed the committee.

PETER WILLIAMSON,

Secretary to the Board of Trustees.

At a meeting of the board of trustees, Second month (February) 23d, 1824 :—

The committee on Patent Medicines made the following report, which was read and laid over for further examination at next meeting.

At a meeting of the board of trustees, Third month (March) 16th, 1824 :—

The further consideration of the report of the committee on Patent Medicines was taken up, and it was on motion accepted and recommended to the college for approbation and adoption, as the standard formulæ for the use of our members.

SOLOMON TEMPLE, *Secretary.*

At a stated Meeting of the Philadelphia College of Pharmacy, held Third Month (March) 30th, 1824 :—

A report of the committee of the board of trustees on the subject of Patent Medicines, was laid before the college and read ; and upon motion referred to a special committee for examination.

Committee, Charles Allen, Daniel B. Smith, Warder Morris, Edward B. Garrigues, and William Baker.

At an adjourned meeting, held Fifth month (May) 4th, 1824 :

The committee appointed to examine the report on Patent Medicines submitted by the trustees, reported the same with a few alterations, which was upon motion accepted : and the formulæ are recommended to the adoption of members as the standard recipes of the college.

Upon motion resolved, that the board of trustees be directed to furnish each member with a printed copy.

DANIEL B. SMITH, *Secretary.*

At a meeting of the board of trustees, Fifth month (May) 18th, 1824 :—Stephen North and William Baker were appointed a committee to procure the printing of two hundred and fifty copies of the recipes for Patent Medicines, in conformity with the resolution of the college.

SOLOMON TEMPLE, *Secretary.*

To the Trustees of the Philadelphia College of Pharmacy:—

The committee to whom was referred the subject of the Patent Medicines, having investigated it, report, that as preliminary to the proposed reform, they have procured from many members of the college, and from other sources, a considerable number of recipes for eight of the Patent Medicines most in use, to which they have confined their attention. These recipes differ so much from each other, as to render a reformation in the formulæ absolutely necessary, and the task of reformation a very difficult one. In some of the recipes for the same medicine, for instance, there are not two articles alike, and the quantity of opium in Bateman's drops varies from one to nearly fourteen parts in a thousand parts of the liquid.* These variations have crept in, no doubt, partly through errors in transcribing the recipes, partly through imitations of the original medicine, made to answer the intention and resemble it in taste and appearance, and partly through attempts at reformation, made from a conviction of the want of authenticity in the recipes in use.

It would be desirable in all cases to ascertain the original formula of the medicine, but though many of the recipes claim to be true and genuine, we have placed no confidence in them as such: for we have seen them differing very much from each other, and with equal claims to genuineness. We are persuaded also that the specifications of the patents filed at the Office of Rolls, (of which these recipes profess to be copies) serve only to mislead. An official copy of the specification of Turlington's Balsam of Life, will satisfy every member of the board, that the medicine either never was prepared thereby, or that it would be absurd with our present skill in pharmacy to revert to such an original.†

* The committee presented, with their report, an extensive table exhibiting the relative proportions of each of the numerous articles employed in the preparation of these medicines, according to the different recipes which they examined.

† Recipe for Turlington's Balsam of Life, taken from a certified copy of specification, as filed in the Office of Rolls, in London.

Gum Benzoin	5 lb.	Gum Elemi	7 lb.
Storax	5 lb.	“ Guaiac.	3 lb.
Balsam Tolu	1 lb.	“ Arabic	8 lb.

Without seeking, therefore, to ascertain the true and original recipe, the committee have attempted a reform in these medicines, according to the following views:—

1. To form a medicine possessing the chief compatible virtues, ascribed to it in the usually accompanying directions.

2. To approach as near as is consistent with this design to the recipes in common use, rejecting inert and superfluous articles.

3. To make the strength of the medicine correspond with the doses ordered in the direction.

4. To direct in their composition articles which are easily procured genuine, and of a price such as not to hold out a temptation to alter or adulterate the medicine.

1. HOOPER'S FEMALE PILLS.

These pills were originally designed, and are constantly used as cathartic and emmenagogue. The different recipes vary so much that aloes is the only article contained in them all. The committee have selected the Extract of Hellebore, the Sulphate of Iron and the Myrrh, as the best emmenagogues; Aloes as the cathartic basis, Ginger and Canella alba as aromatic correctives, and Soap as an adjuvant, and affording an eligible form. The fetid gums which are contained in many of the recipes are rejected as being antispasmodic rather than emmenagogue; the Extract of Savin as difficult to procure, and as necessarily injured in its preparation; the Ivory black as a clumsy and barbarous ingredient; and the remaining articles in the tables, as either inert or superfluous. The following recipe is submitted for the consideration of the trustees:

Balsam Peruv.	5 lb.	Cort. Cinnam.	2 lb.
Aloes Socot.	2½ lb.	“ Winteran.	1 lb.
Myrrh	6 lb.	Caryophyllæ	1 lb.
Gum Oliban.	1½ lb.	Nuces Moschat.	½ lb.
Rad. Angelicæ	1 lb.	Gum Juniper	1 lb.
Sem. Coriand.	1 lb.	Crocus Sativ.	1 lb.
“ Fœnic. Dulc.	1 lb.	Macis	¼ lb.
“ Cardamom.	1½ lb.	Oleum	8 lb.
“ Anisi	1 lb.	Herb. Hyperici	8 lb.
“ Urticæ	1½ lb.	“ Althææ	4 lb.
Gum Mastich	1½ lb.	Spts. Vini Rect.	q. s.
Distil and digest in a sand heat.			

RECIPE.

Aloes Barbadosis	℥viiij	400
Ferri Sulphatis Exsiccati	℥ii 3iss	
Vel Ferri Sulphatis crystal	℥iv	200
Extracti Hellebori Nigri	℥ij	100
Myrrhæ	℥ij	100
Saponis	℥ij	100
Canellæ in pulverem tritæ	℥j	50
Zingiberis in pulverem tritæ	℥j	50

1000 parts.

Beat them well together into a mass with water, and divide into pills, each containing two and a half grains.

2. ANDERSON'S SCOT'S PILLS.

These pills are a mild aloetic purgative, with which, according to the judgment or fancy of the preparer, various adjuvants are combined. The formula submitted by the committee will, it is presumed, be liable to as few objections as any.

RECIPE.

Aloes Barbadosis	℥xxiv	787
Saponis	℥iv	131
Colocynthis	℥j	33
Gambogiæ	℥j	33
Olei Anisi	f.℥ss	16

1000 parts.

Let the aloes, colocynth and gamboge be reduced to a very fine powder, then beat them and the soap with water, into a mass, of a proper consistence to divide into pills, each containing three grains.

3. BATEMAN'S PECTORAL DROPS.

More important errors have crept into this recipe than into any other. The quantity of Opium in one formula is $7\frac{1}{2}$ grs. and in another 106 grs. to the pint. The Camphor varies still more. Castor is introduced into many of the recipes in place of Catechu, which appears to have been an original ingredient,

and which it in no way resembles. The intention seems to have been to form a narcotic and astringent, possessed of diaphoretic and diuretic qualities. Such an intention will at least best answer the purposes for which the medicine is now used, and for which it is chiefly recommended in the printed directions. The formula submitted by the committee, contains half a drachm each of opium, camphor and catechu in a pint, or about a grain of each in half a fluid ounce of the liquid. It contains an equal quantity of opium, with the elixir paregoric or opiated tincture of camphor of the American Pharmacopeia.

RECIPE.

Alcoholis diluti	Cong. iv	1000 parts.
Santali Rubri Rasi	3ij	31.25
Digest for 24 hours, filter and add		
*Pulveris Opii	3ij	31.25
Pulveris Catechu	3ij	31.25
Camphoræ	3ij	31.25
Olei Anisi	f.3iv	7.81

Digest for ten days.†

* Vel tincturæ opii Oij et alcoholis diluti cong. iij Ovj.

4. GODFREY'S CORDIAL.

The quantity of opium in this mild and much used narcotic varies in a very dangerous degree. Some of the recipes contain 4.46 parts, and others only .92 parts of opium in 1000 parts of the liquid. The printed directions state that a large tea spoonful is the dose for a child one year old. Supposing the proper dose of opium for such a child to be the twelfth part of a grain, the quantity contained in 1000 parts of the liquid would be 1.39. As this is however much below the average quantity in the recipes, the committee have adopted

† In the original preparation, the undissolved residuum was kept agitated in the mixture while bottling off, so as to form a sediment in each bottle. The virtues of the opium and catechu are entirely extracted by proof spirit, and the circumstance is merely mentioned that those who wish may preserve the appearance of the original. The colouring used for the artificial brandies may be substituted with advantage for the red saunders in the proportion of three ounces to the gallon.

the proportion of 2.08 to 1000; according to which a grain of opium is contained in an ounce, or two table spoonsful of the liquid, which is the dose for an adult ordered in the printed directions. The salt of tartar, which is found to be very useful as an antiacid, is retained in the proportion of one and two thirds of a grain to the ounce; and the oil of sassafras is adopted as being the carminative which has become one of the chief features in the medicine. The molasses should be that of the sugar refiners, and the composition should contain enough of it to resist fermentation.

The following formula, adopted with these views, is submitted:—

RECIPE.			
Tincturæ Opii	O iss	34.5	} 1000 parts.
Syrupi Nigri	O xvj	367.8	
Alcoholis	O ij	46.	
Aquæ	O xxvj	551.7	
Carbonatis Potassæ	ʒiiss	57.5	
Olei Sassafras	f. ʒiv	11.5	

Dissolve the salt of tartar in the water, add the molasses, and heat over a gentle fire till they simmer; take off the scum which rises, and add the laudanum and oil of sassafras, having previously mixed them well together.

5. DALBY'S CARMINATIVE.

The printed directions for this mild carminative and laxative, order it in doses of a tea spoonful for children, of from one to two years old, and of two table spoonsful for an adult. These doses indicate the proportion of opium to be about a grain to the ounce, which the committee have accordingly adopted. The formula proposed by them contains also thirty-three grains of magnesia, and one and a half grain of salt of tartar to the ounce. This composition they think is well adapted to the doses, and for the diseases mentioned in the printed directions. The combination of essential oils which they have proposed, forms a milder and more grateful carminative than the same quantity of either taken alone. Several of the recipes contain the tincture of castor and assafœtida, which are no doubt occasionally useful, in the cases in which

this medicine is prescribed. Both on account of their nauseous taste, and because the intention in this preparation seems to have been to form a carminative rather than an antispasmodic, we have omitted these tinctures. The following formula is proposed by the committee :—

RECIPE.

Aquæ	O x	1000 parts
Sacchari Albi	3xxxij	200
Carbonatis Potassæ	3ss	3.125
Carbonatis Magnesiae	3xij	75.
Tincturæ Opii	f. 3vj	37.5
Olei Menthæ Piperitis	f. 3ij	.5
Olei Carui	f. 3ij	.5
Olei Anethi Fœniculi	f. 3ij	.5

Triturate the essential oils with the sugar and magnesia, and then add the remainder.

6. TURLINGTON'S BALSAM OF LIFE.

The committee have taken as the basis of their formula, the compound tincture of Benzoin of the pharmacopeias, to which they have added Balsam of Peru, Myrrh and Angelica root. The following recipe, affords, they think, an elegant and rich balsamic tincture :—

RECIPE.

Alcoholis	O viij	1000 parts.
Benzoini	3xij	93.75
Styracis Liquid	3iv	31.25
Aloes Socotrinæ	3j	7.8125
Balsam. Peruviani	3ij	15.625
Myrrhæ	3j	7.8125
Radicis Angelicæ	3ss	3.90625
Balsam. Tolutani	3iv	31.25
Extracti Glycyrrhizæ	3iv	31.25

Digest for ten days and strain.

7. STEER'S OPODELDOC.

The committee have adopted, with slight variations, the Linimentum saponis of the old London dispensatory. They

have added Aqua ammonia, which is contained in several of the recipes in the table, and is an excellent addition; and have substituted for the oil of Origanum the essential oil of the *Monarda punctata*, a native plant nearly resembling it in odour, though more stimulating, and more readily to be procured genuine. In preparing this tincture, it is necessary to use soaps made with animal fats, if we wish the preparation to remain solid. The soaps made with vegetable oils, form solutions in alcohol that remain liquid at the common temperature.

RECIPE.

Alcoholis	O viij	1000 parts.
Saponis Albi	$\frac{3}{4}$ xx	156.25
Aquæ Ammoniæ	f. $\frac{3}{4}$ iv	31.25
Camphoræ	$\frac{3}{4}$ viij	62.5
Olei Rosmarini	f. $\frac{3}{4}$ j	7.8125
Olei Monardæ	f. $\frac{3}{4}$ j	7.8125

Dissolve the soap in the alcohol with a gentle heat, add the remaining articles, suffer the impurities to subside, and pour off into vials while warm.

8. BRITISH OIL.

For the preparation of this patent medicine, there are in use two distinct classes of recipes, one having oil of Turpentine and the other Flaxseed oil or Spermaceti oil as the basis. The character of the medicine as exhibited in the directions, and the uses to which it is now applied, would seem to require a preparation selected from both classes. With this view the following formula is adopted; omitting the *oil of bricks*, a nauseous and unskilful preparation, which has long been banished from the pharmacopeias, although contained in most of the recipes, and introducing Seneca oil in its place. As there appears to be no good reason for retaining it, the Spermaceti oil is also rejected.

RECIPE.

Olei Terebinthinæ	f. $\frac{3}{4}$ viij	326.5
Olei Lini Usitatissimi	f. $\frac{3}{4}$ viij	326.5
Olei Succini	f. $\frac{3}{4}$ iv	163.25

Olei Juniperis	f. \bar{z} iv	20.46
Petrolei Barbadensis	f. \bar{z} ijj	122.47
Petrolei Amer. (Seneca oil)	f. \bar{z} j	40.82
Mix them well together.		<hr/>
		1000 parts.

☞ In this report the weights, measures and preparations of the American Pharmacopeia are adopted as the standard.

In conclusion, the committee call the attention of the trustees to the character of the printed directions for these medicines. We are aware that long custom has so strongly associated the idea of the genuineness of the Patent Medicines, with particular shapes of the vials that contain them, and with certain printed labels, as to render an alteration in them an affair of difficulty. Many who use these preparations would not purchase British oil that was put up in a conical vial, nor Turlington's balsam in a cylindrical one. The stamp of the excise, the king's royal patent, the seal and coat of arms which are to prevent counterfeits, the solemn caution against quacks and impostors, and the certified lists of incredible cures, have not even now lost their influence. In stripping these medicines of their extravagant pretensions and false assertions, the committee are aware that they incur some risk of decreasing their sale. As they now stand however, they carry a falsehood in their very front and are a reproach to the profession. Owing to the very gross falsifications that have been vended under their name, the confidence of the public in them and their consequent sale, have no doubt lessened. If the trustees should therefore adopt the report which is now laid before them; have suitable papers of directions for the medicines prepared and printed; and make arrangements for furnishing them to such of the members as should adopt these recipes; the committee believe that the reputation of the college preparations would soon become widely spread, and that we should reap the benefit of the examination which has now been made, in an increased public confidence in the institution and its members; the influence of which would be felt in extending the drug business of our city.

The committee have made and lay before the board preparations of each of the formulæ recommended by them.

DANIEL B. SMITH,
SOLOMON TEMPLE,
SAMUEL JACKSON.

Philadelphia, 2d mo. 23d, 1824.

ART. VII.—*Pharmaceutical Notices.*—No. 7.

Syrups.—The syrups of Rhubarb, Rhubarb and Senna, Seneka and Orange peel, of the Pharmacopœia of the United States, would be improved by a previous maceration of these articles in diluted alcohol, and evaporation to one half, as is ordered in the common syrup of Sarsaparilla. Speaking from experience, syrups of infusions or decoctions, when made by maceration in diluted alcohol, are more active, are neater preparations, and generally not liable to ferment, as those compounded in the mode prescribed by the Pharmacopœia.

Tincture of ginger designed for the syrup of ginger, should be made from the Jamaica root, as the common ginger, whether dry or fresh, does not afford a tincture of sufficient strength, hence the constant complaints of the weakness of this preparation.

The old formula for the compound syrup of sarsaparilla recommends the use of the pale rose (*Rosa damascena*), and not the red rose (*Rosa Gallica*). The former is emollient and laxative, the latter tonic and astringent. Hence the employment of the pale rose is more appropriate to the character of the medicine, and was intended as an adjuvant to the senna; added to which, from the scarcity of the red rose in our market, it is sometimes impossible to procure it. The substitution of sugar for honey is clearly an advantage, as the latter readily ferments, and should therefore be discarded from all preparations of this nature.

Confections.—Syrups made from sugar are not good excipients for confections, as the preparation thus made will soon

dry, leaving the sugar in a crystalline state. Pure honey of a soft consistence is much to be preferred, it seldom ferments if not combined with water, and retains its original softness for years.

Precipitated Sulphuret of Antimony.—The best mode for preparing this article appears to be that recommended by M. M. Henry Jr. and Guibourt: this consists in using lime instead of potassa, and in precipitating the golden sulphuret of antimony by means of hydrochloric acid. The hydrochlorate of lime formed being very soluble, is much more easily separated from the precipitate by washing, than the sulphate of potassa which is formed where potassa is originally used.

Ointment of Rose Water.—If experiments be made, I think it will be found that a soft ointment will incorporate with, and retain the water better than a hard one. Our national Pharmacopœia, orders rose water, sixteen parts; oil of sweet almonds, sixteen parts; spermaceti, eight parts; white wax, one part. I have altered this as follows: rose water, twelve parts; oil of sweet almonds, sixteen parts; spermaceti, four parts; white wax, one part. The result has been very satisfactory, giving a smooth and soft ointment admirably calculated for the purposes for which it is used.

Conserve of Roses.—In no Pharmacopœias except the British and American is this confection directed to be made from the unblown flowers. Conserve of roses, although frequently used as a vehicle of other medicines, is still advised by some eminent physicians in this country as an astringent and is every where else exhibited as such. In this respect the expanded flowers should be used instead of the unblown ones, which have no astringent property. A handsome conserve of roses may be made from pulverized red roses, (expanded, gathered and dried carefully,) macerated first in a small quantity of rose water, and mixed with white sugar and soft honey of good quality, in equal proportions. The addition of a minute portion of cream of tartar or alum will impart a lively colour.—*E. Durand.*

Adhesive Plaster.—I have found the following mode of making this article to produce a good article: Lead plaster, eleven pounds; yellow resin, and yellow wax, each one pound; Burgundy pitch, three pounds.

These are to be melted in a brass kettle with the addition of sufficient water to keep them from burning, strained through a fine wire sieve into cold water, and formed into rolls; meanwhile malaxating the plaster for a considerable time until it has assumed a fine white texture similar to white shoe-makers' wax.—*T. M'Clintock.*

Syrupus Rhei cum Senna.—The following preparation, in which the same proportion of ingredients is employed as that given in the United States Pharmacopœia, is not liable to ferment in warm weather.

R. Rhei contusi.

Sennæ, a a. ℥vj.

Cardamomi contusi, ℥iss.

Alcoholis diluti, O vj.

Digest in a closely covered vessel, shaking it frequently, for fourteen days; decant the supernatant liquor into a filter; press the dregs and strain the fluid obtained from them; mix the two liquids and evaporate to Oij. Twelve ounces of this intimately mixed with the syrup obtained from two pounds of sugar previously evaporated to Oiss. and still hot, will produce a syrup of about 30° Baumé.

Syrupus Rhei.—The same formula in principle is applicable to the simple syrup of rhubarb,

R. Rhei contusi lb. ss.

Alcoholis diluti O iv.

Treat as above, but evaporate the tincture to Oij. and mix intimately ℥vij of the evaporated liquid, with Oj. ℥f. xij. of syrup obtained as above.—*D. Stewart, Baltimore.*

Test for Balsam Copaiba.—The following simple plan of testing the purity of Balsam Copaiba, and its capability of

solidifying with magnesia, is very effectual, and is, I believe, new. This is its perfect solubility in Spts. Etheris Nit. fort. I have always been successful in making good solidified copiba with balsam which would dissolve in this menstruum and have always failed where the reverse was the case.

Caustic ammonia (proposed by M. Gerber,) will dissolve impure balsam, which will not solidify even when aided by considerable heat; but produces a milky solution, or rather mixture with that which is dissolved by the spirits of nitre. The best balsam I have seen was imported from Angustura; it was of a much lighter colour than any I have since seen, and solidified sufficiently to form pills in one or two hours. I have now a small cask from Brazil, which is of a deeper colour and requires three or four hours to harden, but forms a good mass, and is an efficient medicine.

I obtained from a portion of it, heated with alcohol and caustic soda, according to the process recommended by Ader, (Journ. Phil. Col. Pharm. vol. I. 117,) thirty-eight per cent. of volatile oil, of a very light colour and perfectly transparent. It should be noticed that the Spts. Etheri Nit. used was obtained from Farr and Kunzi, for I have tried the same article from other sources and have totally failed with it. In all the experiments the same calcined magnesia was made use of.—*James Cooke, Fredericksburg, Va.*

Extractum Jalapæ.—There is a disadvantage in boiling down the water on the jalap from one gallon to two pints as directed in the U. S. Pharmacopœia, as besides the active part of the root, we also obtain a very large quantity of amylaceous matter, thereby unnecessarily increasing the bulk of the extract and rendering the liquid extremely difficult to strain. This may be obviated by simply infusing the root instead of boiling. After maceration in alcohol, water almost in a state of ebullition is to be poured on the root, and the whole allowed to digest for twenty-four hours. By this means the water takes up the active matter without the fecula, the liquor is easily strained, and a beautiful extract is obtained much superior in appearance to that obtained by boiling the root.

Extractum Podophylli should be made in the same manner.

Mistura Ferri Composita.—The use of the words “in pulverem tritæ” in the directions given in the U. S. Pharmacopœia, have the disadvantage of probably inducing the pharmacist to employ the powdered myrrh of his shop, which is always artificially divided, instead of rubbing down extemporaneously the best rich fresh myrrh. The powdered myrrh will never make a good milk. A disadvantage also arises from the direction to rub down the myrrh, carbonate of potassa and sugar at the same operation; whereas the myrrh will make a much neater mixture when rubbed down separately, and the other articles subsequently added. This mixture is often disagreeable to the patient from its strong peculiar and permanent taste. A much more palatable form, and which is at the same time rather stronger, is frequently ordered by Dr. H. Bond of this city:—

R. Myrrhæ	3iss.
Ol. gaultheriæ	gtts. vj.
Ol. myristicæ	gtts. ij.
Potassæ carbonat.	ðij.
Sacch. alb.!	℥j.
Ferri sulphat.	3ss.
Aquæ destil.	f.℥ vjj.

Rub down the myrrh and the two oils very gradually with some of the water, used at first by drops till thoroughly mixed, then add the carbonate of potassa and sugar, lastly the sulphate of iron dissolved in the remainder of the water, and bottle the mixture immediately.

The prototartrate of iron, formed from tartaric acid and iron filings, would probably be found an advantageous substitute for many of the preparations of this metal. It has no tendency to become oxidized by long exposure.

Morphia.—The morphia obtained by the process of the U. S. Pharmacopœia is generally mixed with more or less narcotine, particularly that which crystallizes from the first boilings. Narcotine is not dissolved in moderately weak

acetic acid, so that in making the acetate of morphia, nothing more is necessary than to add the acetic acid so long as it appears to dissolve any thing, and then to filter previously to the evaporation, always taking care that the solution be slightly acid to ensure its having dissolved all the morphia. After the filtration, the narcotine remains behind in the form of small white crystals. To prove whether any morphia remains in them, separate a small portion and drop on them a little nitric acid. If any morphia be present, a brilliant red colour will immediately appear very distinguishable from the yellow afforded by the narcotine. In making the sulphate of morphia, the narcotine is dissolved by the sulphuric acid along with the morphia; but in this state, being incapable of crystallizing, it remains chiefly in the mother liquors. To free the sulphate of morphia entirely, it must be subjected to a second crystallization.

The crystals of narcotine may be readily distinguished from those of morphia by attending to the following characteristics. The narcotine is much more easily freed from the colouring matter; readily crumbles into dust between the fingers; is soluble in sulphuric ether; yields a yellow instead of a red colour when touched with nitric acid; and when thrown on a heated plate of iron it burns with a dense smoke and a peculiar pungent fishy odour, very different from that of morphia.

Emplastrum Assafæditæ.—It is impossible to make assafædita plaster by the formula adopted by our national Pharmacopœia from that of the Edinburgh College. The gum will not melt so as to admit of straining, neither will it mix with the other ingredients in its crude state so as to form a plaster. I have made this preparation by dissolving the assafædita in diluted alcohol by means of a water bath, (in the proportion of one quart of diluted alcohol to about a pound of assafædita,) then straining the hot mixture and evaporating to the consistence of a melted plaster or of honey. The galbanum was separately melted and strained, leaving about one fourth of its weight of impurities. The lead plaster and wax were melted together; then the melted and strained galbanum

was stirred in; and lastly the purified assafœdita and the whole stirred until cool. The galbanum might be purified along with the assafœdita more economically than by melting and straining. The assafœdita may also be purified by maceration in water and subsequent evaporation; but the quantity of liquid is necessarily much greater, and consequently more time is required to evaporate it.—*W. Hodgson, Jr.*

ART. VII.—*On Labarraque's Liquid.* By C. C. C. COHEN.
(In reply to ART. XLIII, Vol. IV.)

My object in making the communication respecting Labarraque's liquid, "was a desire that error apparently sanctioned by authority, should not go forth uncontradicted to the world," and this reply is made on the same views.

It was unfortunate that Mr. Durand had never perused his first essay on the chlorides of oxides, since its publication some years ago, until the errors in it were pointed out in my communication; and permit me to say, that I think he should have admitted that the correction of the errors alluded to, was owing to that communication. As a mere dispute about names is not material to the interests of science, I should not have adverted to this subject, except to correct the mistakes made by Mr. Durand. Mr. Phillips is charged with the error attributed to Dr. Granville alone, as can be readily proved by a reference to Mr. Farraday's communication.

Without entering into a long discussion of this subject, I will show that the most concentrated solution of chloride of lime does not equal in strength Labarraque's liquid, prepared according to Farraday's directions.

Chloride of lime contains about twenty-four per cent. of chlorine on the average, and if this be dissolved in twelve parts of water, the solution cannot contain more than the thirteenth part by weight of twenty-four per cent. or 1.84, whilst Labarraque's liquid contains two-thirds of the chlorine disengaged by the decomposition of 767 grains of peroxide of man-

ganese. In a mixture composed as follows: 2800 grs. of carbonate of soda, in 8960 grs. of water, weighing 11760 grs., the quantity of chlorine being equal to 450 grs., we shall find that the mixture will weigh $11760 + 450 = 12210$, which will yield 3.58 per cent. by weight of chlorine; a quantity much greater than can be obtained in any other solution.

Now with respect to Payen's process yielding an identical product with Labarraque's, the following facts will show to be impossible. Payen withdraws from the solution by means of the chloride of lime, two thirds of the carbonic acid of all the carbonate of soda employed; Labarraque on the contrary, does not withdraw a single particle of carbonic acid from the solution; again, Payen has his chlorine combined with caustic soda, which in consequence of changes well known to chemists, becomes chloride of sodium and carbonate of soda, when kept for as short a period as a week. Labarraque has the chlorine combined with the carbonate of soda, on which it has so little tendency to react, that the whole carbonate of soda employed in the solution may be regained by its spontaneous evaporation.

If these facts are not sufficient to prove that the two preparations are not identical, I can adduce none that are, and must leave the subject to the judgment of the reader without further comment.

In M. Gaultier de Claubray's theory, according to the exposition given of it by Mr. Durand, chloride of lime is decomposed by the carbonic acid of a vitiated atmosphere, and it would seem that this was the only agent capable of decomposing it; for my own part I do not believe that carbonic acid will ever completely decompose chloride of lime, although I can readily admit its action in partially precipitating the lime and disengaging the chlorine. Ammonia, its elements and compounds, always exist in atmosphere vitiated by miasmata, or the foetid emanations disengaged during the putrefactive fermentation of organic compounds, and consequently, to ammonia, its elements and compounds (all of which instantly and completely react upon chlorides of oxides) must be ascribed the complete decomposition of these substances.

Mr. Durand assumes as a fact that Payen's liquid, when evaporated to dryness, yields as an ultimate result a bi-carbonate of soda mixed with chloride of sodium. Now is this an absolute impossibility?

Notwithstanding Mr. Durand's recommendation of sulphate of indigo as a test for the quantity of chlorine contained in chloridic solutions, I doubt if he would be able to ascertain it within ten per cent., and as the liquids under consideration do not contain more than 1.75 to 3.58 per cent. of chlorine, this test is obviously inapplicable to them. The best method with which I am acquainted for ascertaining the quantity of chlorine in liquids, is that proposed by M. M. Henry and Plisson, that of dropping the chloridic solution into one of ammonia, and measuring the quantity of nitrogen evolved.

SELECTED ARTICLES.**ART. VIII.—*Preparation of Crystallized Acetic Acid and Acetic Ether.* By M. SEVILLE AUGER.**

ALMOST all the pure and anhydrous acetates will afford a crystallizable acid; the acetate of silver produces it very pure by a dry distillation, but the high price of this salt prevents our using it. Verdigris gives an uncrystallizable acid, rarely containing more than 55° of real acid; two parts of verdigris only affording one part of real acid. The acetate of soda treated by sulphuric acid, gives the purest acid and is the best material to obtain it from. The sulphuric acid is to be purified by boiling it for a short time, and the acetate is to be crystallized several times successively, and then perfectly dried, taking care however, that it does not melt; it is then to be pulverized and redried, passed through a fine sieve and introduced into a perfectly dry retort. The quantity operated on should not exceed eight pounds, which requires twenty-four pounds of concentrated sulphuric acid. In this case the retort should be of a capacity of twelve pints at least. By employing a less quantity of acid the acetate would be imperfectly decomposed, and both sulphuric acid and pyro-acetic spirit would be obtained.

The retort is to be placed over the fire, and connected with a tubulated receiver, having a long neck, and the joinings luted with strips of paper; the neck of the receiver is to turn downwards and pass through a board sufficiently high from the ground to permit bottles of one or two pints capacity to be placed underneath. It is not necessary to use cold water to cool the product.

The furnacè ought to be somewhat larger than merely to

contain the retort, and so high as to reach above its neck; it is not necessary to use a dome; the neck of the retort should be kept from becoming too much heated by means of an iron plate; the bottom of the retort should be a few inches above the fire. The apparatus being adjusted, the acid is to be poured into the retort; reaction will instantly commence, much heat will be disengaged, and if the sulphuric acid contains any nitric, a great quantity of red vapour will be given off. About one eighth of the acetic acid distills off without the application of heat; when the operation slackens, heat is to be applied very gradually. When the whole mass is dissolved, the operation is finished; it lasts generally about four or five hours. Examination must be made from time to time to see that no sulphuric acid distills over, as it is with great difficulty that we can prevent a small quantity, not only of this acid, but also of sulphate of soda, from passing into the receiver. As soon as the operation is terminated, the acid sulphate must be removed from the retort, the neck of which must be well heated to prevent its breaking.

To rectify the acetic acid, a sufficient quantity of acetate of soda is to be added to saturate the sulphuric acid, and the mixture redistilled with the above-mentioned precautions. Towards the end of the operation there are many explosions. The first products are the weakest. When the specific gravity is less than 1.0766, or 11°.3 of a good areometer at 60° F., the acid which passes over is crystallizable at 39° to 40° F. When the specific gravity is at 1.0622 or 8°.6 of the areometer, the acid is at its maximum of strength. The rectified product generally amounts to two kilogrammes (five pounds,) of a medium density of 0.80°; not more than one and a half kilogrammes (three pounds) of pure acid can be obtained.

Acetic acid crystallizes in thin laminæ at 59° F.; the temperature may be lowered still more, however, without its solidifying, but then the slightest agitation induces crystallization. The crystals dried on blotting paper, melt at 71° with a disengagement of heat. It appears that the crystallized acid, if melted, will not again assume the crystalline form, until the temperature is reduced considerably more than at first. It

boils at 225 F., and is rapidly distilled even without boiling. When liquid, it will take fire and burn like alcohol. It has a great affinity for water, of a proportion of which it cannot be deprived, except by combining it with a base; the chloride of calcium is not able to deprive it of this fluid. Anhydrous sulphate of soda dissolved in warm and strong acetic acid, of at least 0.20, deprives it of its water, and crystallizes; whilst this sulphate in a crystallized form, when dissolved in hot acetic acid of 0.85, gives out its water, and precipitates in an anhydrous form.

Sulphate of soda may be used to bring vinegar or pyroligneous acids of 0.05°, or 0.06° to 0.20°; but they must be subsequently distilled to get rid of this salt. It should always be attempted to obtain this acid at a single distillation, for at each repetition of the process there is some decomposition which gives an empyreumatic odour to the product. If it is not wished to obtain the acid perfectly pure, it may be prepared in large quantities, and at a cheap rate, with purified pyroligneous acid at 0.40°, obtained by the decomposition of acetate of soda by sulphuric acid. A copper alembic furnished with a silver worm and condenser is to be used; this is to be charged with the acid deprived of all sulphate of soda by a previous distillation, and the first product is to be rejected as being too weak; the distillation is continued almost to dryness, this is to be repeated twice, the apparatus is then to be taken apart and cleansed, and then again charged with the whole or a part of the three distillations, the medium strength of which is about 0°.55 and of a specific gravity of 10°.656 or 10°.2; it is again to be distilled, giving products which are to be kept apart, of from 10°.766 or 11°.3, at 60° F. When it has reached this point it decreases whilst the strength of the acid increases; the recipients are now to be changed, and it will be found that the products are more crystallizable according as they are less dense.

The same apparatus may be used for obtaining acetic ether on a large scale and of great purity. For this purpose, 30 kilogrammes (76 lbs.) of pure acetate of soda, well dried and sifted, is to be introduced into the alembic with 43 litres (126 pints) of

alcohol, at 33°; these are to be well mixed, and 9 kilogrammes (22 lbs.) of concentrated colourless sulphuric acid added, and the whole carefully stirred; the cover is then to be placed on, and a curved tube adapted by which 18 kilogrammes (44 lbs.) more of the sulphuric acid can be added. Much heat is disengaged, and the ether is produced without the aid of heat, and at first runs off in a stream; when it begins to come over in drops, heat is to be applied, the distillation continued almost to dryness; 56 kilogrammes (138 lbs.) of impure ether of 19° Cartier will be obtained, which is to be redistilled with 20 lbs. of sulphuric acid, producing 47 kilogrammes (120 lbs.) of ether at 24° Cartier, to which is to be added about one kilogramme (2½ lbs.) of slacked lime; after some time the fluid is to be decanted and redistilled, separating the first portions which come over, these are yellow and turbid, having a density of 23° Cartier, the density augments to 27°, and the distillation is to be continued until the liquid passes over acid and of a brown colour. By this means 4 kilogrammes (10 lbs.) of ether at 26° Cartier or 0.900 are obtained, which contains but a small portion of water and alcohol. If it is wished to obtain it very pure, it must again be distilled with one or two kilogrammes (3 or 4 lbs.) of concentrated acetic acid, washed, passed over a little lime and potassa, and, finally, rectified over chloride of calcium.—*Journ. de Chim. Med.*

ART. IX.—*On the transformation of Hydrocyanic Acid and the Cyanides into Ammonia and Formic Acid.* By M. J. PELOUZE.

STRUCK with the identity of composition which calculation indicates between the formiate of ammonia, and a supposed solution of hydrocyanic acid in three atoms of water, and of the formation of hydrochlorate and of sulphate of ammonia, observed by M. Kuhlman, on adding hydrochloric and sulphuric acids to the hydrocyanic, I was desirous of observing how far this remarkable analogy extended, and therefore undertook the following experiments.

Anhydrous hydrocyanic acid prepared according to the process of Gay-Lussac, was added to about its own volume of fuming hydrochloric acid. In about four or five minutes the mixture assumed a crystalline appearance, producing a very sensible disengagement of heat. This mass subjected to distillation, volatilized without residue; and successively afforded hydrocyanic, hydrochloric and formic acids, and finally hydrochlorate of ammonia. I recognized the formic acid, from the liquid product of the distillation, when heated with the red oxide of mercury, producing a violent effervescence, owing to a disengagement of carbonic acid. The mercury instead of being reduced to the metallic state, as takes place with pure formic acid, was found in the state of a protochloride.

Sulphuric acid gave rise to a reaction similar to that produced by the hydrochloric acid, except that it operated with more difficulty and less quickness. The formic acid can be obtained by distillation, and it may readily be separated from such parts of the hydrocyanic acid as have not been acted upon. This operation, however, requires some precautions, in order to succeed perfectly; as the sulphuric acid easily converts the formic acid into water, and gaseous oxide of carbon. It must therefore be diluted with water, and not used in excess. Having observed these phenomena, it was not difficult for me to account, on the one hand, for the great differences in the quantities of hydrocyanic acid obtained from the same weight of cyanide of mercury; and on the other, for the great solubility and other peculiar properties of the residuum in the preparation of this acid.

One proportion of cyanide of mercury treated by one proportion of slightly fuming hydrochloric acid, the strength of which had been ascertained by saturation, afforded me one proportion of hydrocyanic acid and one of perchloride of mercury, but no formic acid or ammoniacal salt; but when I employed an excess of hydrochloric acid, this excess meeting with hydrocyanic acid and water, gave rise to formic acid and hydrochlorate of ammonia, which entering into combination with the bi-chloride of mercury, produced that double

salt formerly known under the name of *Sal alembroth*; in this case but a small quantity of hydrocyanic acid was obtained. This double salt of mercury and ammonia had all its peculiar characters, and besides, it sufficed to treat the residue of the operation with lime, to demonstrate the presence of ammonia by its pungent smell. Where equal proportions of hydrochloric acid and cyanide of mercury are employed, the residue does not contain the ammoniacal salt, and is only composed of chloride of mercury.

With the cyanide of potassium, the same action,—the production of chloride of potassium and of hydrochlorate of ammonia, if an excess of hydrochloric acid has been employed. In the contrary case, there is no ammoniacal salt formed. These experiments demonstrate care must be taken in the preparation of hydrocyanic acid by the method of Gay-Lussac, not to employ an excess of hydrochloric acid, as the low price of this latter and the high one of the cyanide of mercury might induce us to do.

I endeavoured to discover whether the possible presence of formic acid has any thing to do with the sometimes so rapid and sometimes so slow spontaneous decomposition of hydrocyanic acid; the transformation of the hydrocyanic acid into ammonia and formic acid under the influence of water and the acids, led me to look for analogous cases, and I found a remarkable one in the treatment of the cyanide of potassium by the action of heat aided by that of water. A concentrated solution of the cyanide of potassium subjected to ebullition without contact with the air, was decomposed; one proportion of this cyanide acting on four proportions of water, gave rise to one proportion of ammonia, which was disengaged, and one proportion of formiate of potassa. This transformation, produced by the mere ebullition of the solution, went on at first with rapidity, gradually slackened, and was completed only after the water, which had evaporated, had been several times renewed. If instead of heating the moistened cyanide of potassium, it be calcined dry, and not exposed to the air, it is not decomposed at any temperature; but the addition of an excess of caustic potassa, produces, as in the former expe-

riment, ammonia and formiate of potassa, which when the fire is increased, is decomposed just below a dull red heat; assuming therefore, at one proportion, the water of the potassa, one proportion of oxygen to form two proportions of carbonate of potassa, whilst two proportions of hydrogen are disengaged.

In subjecting a solution of cyanide of mercury to the action of heat, there is a production of formic acid, as in the preceding case, but the greatest part of this acid is decomposed by the oxide of mercury, whence results, besides the formation of ammonia and hydrocyanic acid, a disengagement of carbonic acid, and the reduction of the oxide.

Curious to know what action was exercised on the animal economy, by a body which has exactly the same composition as a supposed solution of hydrocyanic acid in three proportions of water, I sent a certain quantity of the formiate of ammonia to M. Kunckel, Jr. He administered it in large doses to animals without any effect. I myself dissolved a gramme in a half glass of water, which I drank without any disagreeable result. The impossibility of obtaining Prussian white with this salt, led me to foresee its want of medical properties.

The formiate of ammonia is very soluble in water, of a white colour, and a fresh and pungent taste. When subjected to the action of heat, it completely fuses at 120° C. ; at 140° C. it gives out a small quantity of ammonia, and at 180° C. it is transformed into hydrocyanic acid and water. Only a few traces of the formiate escapes decomposition, when the operation is performed in a narrow tube plunged into a column of mercury, kept at a temperature of 180° C. The product of the distillation is an excessively concentrated hydrocyanic acid, for it contains less than its weight of water. This decomposition cannot be better compared than to that of the nitrate of ammonia into water and protoxide of azote, and is effected with the same facility.

The result of these experiments being verified, are we to regard hydrocyanic acid dissolved in water, as formiate of ammonia? If on the one hand, the action of acids on the

hydrocyanic acid, which gives rise to ammoniacal salts and formic acid, militates in favour of this hypothesis, on the other hand, the medical inertness of the formiate of ammonia, its not affording Prussian white, without being subjected to the action of heat, authorize another view of the subject, and would rather lead us to assimilate the aqueous solution of hydrocyanic acid to that of other acids. At the same time, if it be true, as has been asserted, that Prussic acid diluted with water, does not always act as a poison, we may be permitted to suppose that this diluted acid is sometimes susceptible of passing into the state of a formiate of ammonia.

A knowledge of some of the facts in this paper, is important to the manufacturer of Prussian blue and of ferrocyanate of potassa; it will teach him that he must be careful to avoid boiling the residue of the animal matters treated with potash, in water, or of throwing this residue whilst it is yet hot into water, and finally to calcine these animal substances with an excess of the alkali. In each of these cases, it would be decomposed and produce formic acid or ammonia or else this alkali, hydrogen and carbonate of potash. It should be heated with cold water and the sulphate of iron added to the solution before heat is applied. When the cyanide of potassium has once combined with the iron, it acquires sufficient stability to evaporate without alteration. To recapitulate:—

1. Hydrocyanic acid is transformed into ammonia and formic acid by the action of hydrochloric and sulphuric acids, and doubtless also by many others.

2. A concentrated solution of the cyanide of potassium, subjected to the action of heat, is changed into ammonia and formiate of potassa.

3. The same salt at a high temperature and united with an excess of potassa, yields hydrogen, ammonia and a residue of carbonate of potassa.

4. One proportion of cyanide of mercury in acting on one proportion of hydrochloric acid, yields one proportion of hydrocyanic acid and one proportion of perchloride of mercury.

5. An excess of hydrochloric acid produces with this salt,

a double chloride of ammonia and mercury, formic acid and a little hydrocyanic acid.

6. Formiate of ammonia subjected to the action of heat at 180° C. is transformed into water and hydrocyanic acid.

Journal de Pharmacie, April 1832.

ART. X.—*Experiments upon the Solidification of raw Gypsum.* By JOHN P. EMMET, *Professor of Chemistry in the University of Virginia.*

THE facility with which burnt gypsum sets, when made into a paste with water, has rendered it not only conspicuous among minerals but highly useful in the arts; hitherto, however, as far as I am aware, it has not been supposed that the raw or natural production is capable of exhibiting the same property. The following experiments, although resulting from an enquiry not professedly connected with the subject of the present communication, and therefore not, perhaps, carried as far as they might have been with advantage, are considered of sufficient importance to receive a distinct notice. They satisfactorily show that native gypsum may be rendered capable of perfect solidification without having undergone the operation of burning, and may perhaps contribute to illustrate or render more available the setting property of this valuable natural production.

Raw gypsum, finely pulverized, is capable of undergoing immediate and perfect solidification, when mixed with certain solutions of the alkali potassa. Among those that answer best, may be enumerated caustic potassa, carbonate and bicarbonate, sulphate and super-sulphate, silicate and double tartrate or Rochelle salt.

In all these cases, the process may be easily rendered more expeditious than when burnt plaster alone is employed, and the resulting solid, after having been properly dried, does not seem to differ essentially from that usually obtained, except in composition. There does not appear to be any exact point of saturation; for the solid masses, when broken up and

worked with fresh portions of the solutions, constantly recover their tendency to set, even when the saline matter is in very great excess; yet, no doubt, each case requires a specific amount, in order to produce the maximum of solidity. When water alone is employed, after the first mixture, the paste rarely exhibits any remarkable tendency to become hard; but a fresh application of one of the foregoing solutions never failed to develop it promptly.

There is also a marked difference as to the time required for the operation; solutions of carbonate and sulphate of potassa, if sufficiently dilute, produce their effects so slowly as to admit of complete incorporation, whereas Rochelle salt acts as soon as the powder touches the fluid and all subsequent motion necessarily weakens the cohesion. If crystals of Rochelle salt be triturated with raw gypsum and water, and then brought in contact with the mixture, there will be no apparent interval of time between contact and solidification. This extreme rapidity effectually prevents incorporation by the ordinary mode, and would induce one to imagine that Rochelle salt does not possess the power; for when the gypsum and solution are worked together with a spatula, although the particles feel hard and harsh, they readily crumble, and by continuing the operation, actually assume a semi-fluid condition.

No other salts, but those holding potassa, were found to render raw gypsum capable of solidification. Those of soda, as far as they were examined, invariably produced a contrary effect, if we except Rochelle salt, which, however, seems to operate by its potassa. Yet it is remarkable that several neutral salts of the latter alkali, as the nitrate and chlorate, did not occasion the slightest alteration. The bicarbonate of potassa invariably produced a brisk effervescence, which considerably impaired, although it did not prevent, solidification. The same disadvantage characterizes the action of supersulphate of potassa, whenever the mineral contains an admixture of carbonate of lime, as was found to be the case with the specimen of gypsum under examination. As the idea has been advanced that the setting property of

ordinary burnt plaster, depends upon the presence of carbonate of lime, most of these experiments were repeated, with equal success, upon pure sulphate of lime obtained by precipitation.

The opinion that carbonate of lime facilitates or causes solidification in the ordinary case, seems but little entitled to belief, when it is considered that the heat, necessary for the burning of plaster, falls far short of that required for bringing limestone to its caustic state, or even to that half calcined condition which renders it capable of hardening under water; but, whatever may be its agency, subsequent to the application of heat, the operation must be totally different in the present case, since the supersulphate of potassa completely decomposes all the carbonate of lime in the gypsum.

It is probable, as Gay-Lussac has observed, in his examination of this singular property of burnt plaster,* that we should refer the fact to an inherent property of the mineral; yet I cannot but think the foregoing experiment abundantly proves that it does not always depend upon the simple union with water, and subsequent aggregation of the saturated particles, as seems to be the fact with burnt plaster. These cases may not, indeed, be parallel, as some of the saline solutions added, *partially* affect the composition of the gypsum; yet I have satisfied myself that the alteration is neither uniform nor essential to the result, although it is extremely difficult to ascribe the solidification, in the foregoing instances, to the proper cause. Both potassa and its carbonate are extremely deliquescent, and do not, therefore, act by rapidity of crystallization; sulphate of potassa cannot affect the composition of sulphate of lime, and although the former salt may possibly be formed in all the cases of mixture enumerated, it does not seem to form any permanent combination with the gypsum, since the latter, in two experiments, was found to lose one twelfth of its weight by the mixture of the substances and subsequent washing with warm water. The only uniformity observable, in all the saline solutions capable of producing soli-

* Annales de Chimie et de Physique, tom. xl. p. 436.

dification, is the necessity of the presence of potassa, and the rapidity with which the operation takes place seems greatly opposed to the supposition that the result depends upon double decomposition. If we take the pulverized gypsum and saturate it by the solution of carbonate of potassa, all subsequent chemical action, from the same substances, should be prevented, and yet, when the solidified mass, thus formed, is worked up again with a fresh portion of the same saline solution, it sets with equal facility. This property appears but little diminished by three or four repetitions. As plain water does not answer, until after the evaporation of the fluid, it seems more probable that the saline solutions exert a kind of repulsion towards the particles of gypsum, and thus tend to promote that solidification which is so very characteristic of it in the burnt state.

The experiment which first exhibited the solidifying property of raw gypsum, was well calculated to give the impression that chemical decomposition was necessary for the result. I wished to determine how far fresh precipitated carbonate of lime was capable of improving gypsum, (intending subsequently to burn the mixture;) with this view, pulverized, raw gypsum was placed on a filter, and a cold solution of carbonate of potassa poured over it. The result was the rapid solidification of the crude mineral and an evident diminution of the alkali. Upon repeatedly returning the same solution through the filter, tumeric paper ceased to indicate the presence of potassa, and reagents showed that sulphate of potassa had taken its place. In this manner, a saturated solution of the latter salt may soon be obtained. Yet, as has been already stated, a further examination proved that the sulphate of potassa is not capable of contracting a permanent union with the gypsum.

Further enquiry will, no doubt, lead to the detection of salts better adapted to the developement of this property than those here noticed, but the cheapness of carbonate of potassa seems more likely to recommend its use for practical purposes, provided it shall be found that the solidification of raw or effete plaster, by the process here indicated, equals, in

durability, that which has been recently burnt. Gypsum, it is well known, requires judicious treatment, in order to fit it for taking casts, and unless carefully defended from moisture, will soon lose its valuable property. The process of burning may, moreover, not always be convenient, and in this case, a solution of carbonate of potassa, or, for common purposes, the ley from wood ashes, will always enable the operator to effect rapid solidification, and, as far as I have observed, it is perfect.

ART. X.—*On the Chemical History of Meconine.*

By M. CONERBE.

[EXTRACT.]

THE author announced that he had discovered this substance in 1830, without, however, being able to ascertain its properties, from the small quantity obtained. Before he began another series of experiments, he learnt that M. Dublanc, Jr. had previously found an azoted substance, burning without flame, giving rise to ammoniacal products, and containing much more hydrogen than is found in narcotine. M. Conerbe is of opinion that the crystalline substance he denominates meconine, is identical with that which has been obtained, but incompletely studied by M. Dublanc.

Pure meconine is solid, white, inodorous, at first almost tasteless, and afterwards sensibly acid; it is soluble in water, alcohol and ether, and crystallizes from these three menstrea. The crystals are six sided, terminated by a dihedral pyramid; it melts at 194° F. and is then colourless and very limpid; it preserves its liquidity till the thermometer has descended to 163° F.; at 343° F. it volatilizes and distils over without alteration, and on cooling assumes the form of a white mass resembling fat.

Meconine dissolves in 265.75 parts of cold water and 18.55 of boiling water. Alcohol, ether, and the essential oils dissolve much more than water; potassa and soda also dissolve meconine without altering it. Sulphuric acid, diluted with a quar-

ter or half its weight of water, dissolves this substance without the assistance of heat. This solution is limpid and colourless; exposed to a gentle heat, greenish striæ are formed, which increase as the concentration is greater; finally all the fluid assumes the beautiful deep green of chlorophylline. The meconine, in this state is completely decomposed and cannot be reproduced.

If alcohol be poured on this green sulphate of meconine, a mixture takes place and the fluid assumes a bright rose colour; but if the alcohol be driven off by heat, the green reappears. If instead of alcohol, water be added, there is a precipitate of a brown flocculent substance, which is not redissolved even with the assistance of heat. These flakes are to be separated by the filter; the fluid then appears of a decided, but not deep rose colour; concentration by a gentle heat restores the green colour. This double change can be reproduced at will, until the organic matter in the solution is exhausted.

The brown matter separated by the filter, is soluble in concentrated sulphuric acid, which it colours green; also in the alkalies, alcohol and ether. Its solution in the two latter is of a beautiful deep rose colour. The salts of lead, alumina, or tin, when added to the alcoholic solution diluted with water, precipitates it in the form of a lake. It is obvious that it is this brown matter that colours the solution green, in one case and rose coloured in the other, according to the presence or absence of water.

Concentrated nitric acid dissolves meconine at common temperatures. The solution which is of a beautiful yellow colour, affords on the addition of water, a precipitate which has not been studied. If the nitric solution be subjected to a gentle heat, the acid is disengaged without any apparent sign of nitrous gas, but yellowish crystals are formed at the edge of the capsule which are unalterable even on evaporation to dryness. When the whole of the acid has been driven off, the remaining mass melts and on cooling again forms yellowish crystals.

On passing a current of pure and dry chlorine over meconine heated to fusion, a red colour is produced, which deepens

as the gas is absorbed, till at last the mass becomes blood red. In this state it requires a temperature far higher than that at which meconine melts, to remain in a liquid state; on cooling it loses its beautiful red colour, and crystallizes in needles. The author states that it is a chloride of an organic base, composed of

Chlorine	25.75
Organic matter	74.25.

We say a chloride of an organic base, for its radical, as will hereafter be seen, is not meconine, as it would have been natural to suppose. After having developed the principal properties of meconine, the author speaks of its composition. This substance not being azoted, as has been already shown, its analysis was easy. Four experiments, each made on a decigramme of meconine, gave the following proportions :—

Carbon	60.247
Hydrogen	4.756
Oxygen	34.997.

These numbers correspond to nine atoms of carbon, nine of hydrogen and four of oxygen; which fixes its atomic weight at 1142.102. The analysis calculated on this formula gives nearly the same sums as those obtained by actual experiment; or,

Carbon	60.234
Hydrogen	4.742
Oxygen	36.023.

M. Conerbe then returns to the crystals obtained by the evaporation of a nitric solution of meconine. These crystals contained a little nitric acid, which could not be wholly driven off by heat, without altering the organic matter; but which may be got rid of, by dissolving this product in boiling distilled water; collecting the crystals which are deposited on cooling, dissolving them in boiling alcohol and crystallizing. The substance, which after this purification contains no free acid, is in the form of long and slender four sided prisms, with a square base. Exposed to a temperature of 334° F. they melt, and at 422° F. are for the most part volatilized; the remaining portion dries, and on an increase of

temperature is decomposed, giving out a smell of bitter almonds. When thrown on live coals, it burns, diffusing an odour of hawthorn.

Ether also dissolves this substance; the solution is colourless, which is not the case with alcoholic and aqueous solutions. The concentrated acids do not destroy this substance, but dissolve it with the aid of a gentle heat, affording crystals on cooling. If the acid solution be diluted with water, it appears colourless, like that made with ether, and the crystals resulting are of a brilliant white colour.

Potassa, soda and ammonia, dissolve this substance with great facility; the addition of an acid, precipitates it in its original form. From the above, it appears that this substance is endowed with many properties which ally it to the acids; like them also, it acts, though feebly, on the vegetable colours. M. Conerbe has attempted to investigate the composition of this substance; but having operated on a very small quantity, he obtained results of so uncertain a character, that we shall not detail them. He afterwards examined the crystalline product obtained by the reaction of chlorine on meconine. This was almost insoluble in boiling water, and scarcely acted on by sulphuric ether; alcohol at 36° and boiling, dissolved it with difficulty; nevertheless, when the solution was effected, crystallization did not take place on cooling, requiring evaporation for this purpose. When left to itself, this solution afforded granular crystals, of no determinate form, contaminated by a yellow matter, which may be removed by cold alcohol at 38° and offers all the physical characters of a soft resin. The crystals cleansed from this resin are white, of an acrid and acid taste, soluble in ether and alcohol, very little so in water, melting at 289° F. and volatilizable at 406° F. Placed on burning coals, they burn without flame, affording a smoke of a white colour, having an odour like that of Jasmine. They contain,

Chlorine 5.43

Organic matter 94.57.

When heated in a small tube, this compound melts and assumes a yellowish colour, when the temperature reaches 289°

F. it rises along the tube and may be distilled in the form of a crystallizable yellow liquid. In this operation, a small portion of the matter is burnt, giving rise to acid products and leaving traces of charcoal at the bottom of the tube. When dissolved in weak alcohol and treated by the oxide of silver, it parts with its chlorine. The excess of oxide of silver and the chloride may be separated from the fluid by the filter, and if this fluid be now subjected to crystallization, a white, pearly matter is obtained in the form of powder, which is soluble in ether, and on crystallizing from this menstruum assumes the form of very short four sided prisms.

This pearly matter, which is the radical of the chloride, begins to melt at 352° F. and volatilizes at 361° F.; it reddens litmus paper, and precipitates the salts of lead and copper, but has no effect on those of silver, iron, lime, or mercury. Sulphuric or hydrochloric acid do not affect it, nitric acid destroys it, but does not appear to convert it into oxalic acid. Alcohol and ether, as has already been said, dissolve this substance, and deposit it on cooling; boiling water also dissolves it, and permits it to crystallize on cooling, in the form of very white and delicate four sided prisms.

From the resistance of this substance to the action of strong acids, M. Conerbe at first thought it might be Benzoic acid, but comparative experiments made with great care, convinced him that it was a new immediate principle, which he has denominated mechoic acid.

Extraction of Meconine.—This substance is far from being abundant in opium; that from which the most is obtained is neither the best nor the dearest; in fact Smyrna opium is best for the purpose. This is to be finely divided and treated with cold water till this fluid is no longer coloured; it is then to be filtered and evaporated to 8° Baumé, and ammonia diluted with six times its weight of water added as long as any precipitate ensues.

The compound precipitate thus obtained, is separated by decantation after standing for two or three days. It is to be washed as long as the washings are coloured; these washings are to be added to the ammoniacal menstruum in which the

precipitate took place, and the whole subjected to a gentle heat, till it has acquired the consistence of clear molasses. It is then to be placed in a cool situation; in two or three weeks there will be found a granulated mass, the surface of which is often covered with a coating of beautiful crystals. These crystals are to be separated from the mother water by decantation, and dried by pressure aided by heat. To extract the meconine from them, and to separate the meconates, and other substances, with which they are mixed, they are to be several times treated with boiling alcohol, at 36°. When this fluid appears to have no action on the mass, the alcoholic washings are to be united together, and evaporated till only one third is left, when crystals will form on cooling.

The crystals thus obtained are not pure; they still contain meconates and colouring matter. To get rid of the latter, they must be dissolved in boiling water, and treated with animal charcoal. The crystals obtained on evaporation, besides the meconates spoken of above, contain a greater or less quantity of narceine. To separate these different substances, the compound should be treated with boiling ether, which dissolves only the meconine, and deposits it on cooling and evaporation. It is useless to wait for the total disappearance of the ether to collect the crystals, for there is this remarkable circumstance as regards meconine, that no matter in what solvent it begins to crystallize, almost the whole of it precipitates, so that very little remains in the liquid.

The whole of the meconine is not always to be found in the ammoniacal liquids from which the morphine has been obtained; it is often precipitated with this substance, and remains united with it, if the washings are not conducted with great care. When it is suspected that these bodies are united, M. Couerbe indicates how they may be separated, without interrupting the process to obtain the morphine. He has always operated on large quantities of opium; he thinks that if his experiments be repeated on small quantities, as a few ounces for instance, the meconine may escape notice, as it only enters a two thousandth part into the composition of opium.—*Jour. de Chi. Med.*

ART. XI.—*On the Coca.* By ALEXANDER COCHET.

Coca is the leaves of a shrub indigenous to Peru, and growing to the height of two to four feet. The flowers of this shrub have some resemblance to those of the *griotte*, (a species of cherry,) but are rather smaller. Its fruit is a drupe about the size of a grain of pepper, but oblong, composed of a red pulp, surrounding a one seeded nut.

This shrub is cultivated in several parts of Peru. The leaves are gathered three times a year, first in the month of April. They are dried in the sun, and then packed in small bales. The shrub is in bearing for fifteen or twenty years.

There is a great consumption of coca, the annual value being from four to five millions of dollars. The Indians are so habituated to its use that they can bear any privation except of it, and the medical men of the country declare that without coca the Indians are not capable of supporting the fatigues of mining, or even of resisting the rarified air of some parts of the country. They chew it whilst on a journey, swallowing the juice, the extraction of which, as well the secretion of saliva, they aid by also holding in their mouth a fragment of a kind of crude but weak potash, which they obtain by making a paste of ashes and drying it in the air. This alkaline substance is known in Peru by the name of *ypta*, and forms an object of merchandize.

When provided with coca, they can make rapid journeys without suffering in their respiration, and can take unremitted exercise without being worn out by fatigue. They have been known, when acting as guides, to travel twelve or fourteen leagues without stopping, and to perform this as rapidly as the best mounted horseman. This arises from the circumstance, that in these elevated regions the horses soon suffer in their wind, and hence gradually relax their speed; whilst, on the contrary, the Indians, by constantly using the cocoa, do not thus suffer, and always keep the interior of their mouth in a moist state.

The inhabitants of the country support all kinds of fatigue for two or three days, without any other stimulant than the coca.

Some persons take it in the form of tea, and consider it as very favourable to the health. The author himself experienced good effects from it in attacks of cholic, which are of very common occurrence in Peru.

When chewed in large quantities, the coca causes a kind of intoxication and loss of sleep. The taste of the leaves is of a faint aromatic bitter.

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ART. XII.—*Specific Gravity of Volatile Oils.* By
M. GUIBOURT.

IN the July number of our Journal (page 145 et seq.) we gave a paper of M. Guibourt's on the specific gravity of the volatile oils; since then this learned experimenter has given several important corrections of errors to be found in his original article. The principal of these are, that M. Chardin used by mistake in some of his experiments a centigrade thermometer instead of Reaumur's. Thus the specific gravity of the oil of bitter almonds having been determined at a temperature of 20°, M. Guibourt gave it as 25°, supposing that Reaumur's thermometer had been used. The first number must therefore be substituted;—hence all the temperatures marked Ch. 25° should be 20°; Ch. 18°.75 should be 15°; and Ch. 12°.50 should be 10°. The temperatures Ch. 18° must not be changed.

M. Guibourt goes on to say that some other errors should also be corrected; thus, for bergamot, Ch. 25° specific gravity 0.8675, read 0.8775; camphor, Briss. 11°.50, read 12°.50; turpentine, Briss. 31°.66, read 12°.56.

M. Guibourt also adds the following table of the specific gravity of volatile oils as determined by M. Th. Martius of Erlangen, as well as the reaction caused by these oils on the tincture of litmus. Those marked M. were prepared by M. Martius himself:—

SPECIFIC GRAVITY OF VOLATILE OILS.

NATURE OF THE VOLATILE OIL.	SPECIFIC GRAVITY.	EFFECT ON LITMUS.	OBSERVATIONS.
Aniseed M.	0.9853	scarcely reddened.	Recent.
“ East Indian C.	0.987	not reddened.	“
Amber, red	0.9641	slightly reddened.	“
“ rectified M.	0.8578	strongly reddened.	“
Balm	0.8546	not reddened.	Prepared for a year.
Bergamot	0.8737	do. do.	Recent.
“	0.8801	very slightly red'd.	“
Cajeput	0.9246	reddened.	“
“ rectified M.	0.916	not reddened.	“
Chamomile (genuine) M	0.924	“	“
“ spurious M.	0.870	“	“ [years.
Cassia	1.0608	reddened.	Prepared for two
Cinnamon	1.0906	strongly reddened.	“
Carraway M.	0.9619	“ “	“
Cedrat (Lemon)	0.869	feebly reddened.	“
Cedar	0.8609	“ “	“
“	0.869	“ “	“
Fennel M.	0.9853	not reddened.	“
Juniper M (from berries)	0.9120	strongly reddened.	“
Cloves M.	1.0555	scarcely reddened.	“
“ from the peduncles	1.009	not reddened.	“
Oil from bituminous } coal rectified M. }	0.795	“	“
Lavender	0.886	feebly reddened.	“ [year.
“ rectified	0.8875	reddened.	Prepared for one
“ “	0.872	“	Recent.
Lemon (<i>Citrus limetta</i>)	0.931	strongly reddened.	“ [rated.
Mace	0.8715	not reddened.	Apparently adulte-
“	0.947	strongly reddened.	“
Orange M.	0.845	not reddened.	Prepared one year.
Peppermint	0.9013	“	“
“ rectified M.	0.9098	“	“
“ not rectified M.	0.9024	“	“
Petroleum	0.851	“	“
“ rectified M.	0.814	“	“
Savin	0.931	“	“
Sassafras	1.0842	reddened.	Old, with deposit.
“	1.0809	“	“
Semen contra	0.912	“	“
Tansy	0.889	not reddened.	“
Turpentine not rectified	0.8832	strongly reddened.	“
“ rectified M.	0.9056	feebly reddened.	“
Valerian M.	0.9438	strongly reddened.	“
Wormwood M.	0.8947	not reddened.	“
“ of commerce	0.877	“	“

ART. XIII.—On Parffin and Eupion.

DR. REICHENBACH has discovered two substances by the dry distillation of organic bodies, to which he has given the above names. The first from *parum affinis*, on account of its remarkable indifference or want of affinity; and the second from $\pi\omega\upsilon$ or $\pi\sigma\nu$ fat, and $\epsilon\nu$. These substances appear to be both contained in the tar of animal and vegetable substances. Beech wood tar yields the most paraffin, and with the greatest facility; while the oil of Dippel gives most eupion.

If the tar obtained by the carbonization of beech wood be subjected to distillation, the receiver, provided it has not been changed nor removed, contains three different liquids: at the top, light oil of tar, in the middle a watery acid liquor, and at the bottom heavy oil of tar. This last is to be subjected to repeated distillations; and when the product becomes rather thicker, and contains small shining particles, the receiver is to be changed, and the heat is to be increased as much as the glass will allow of, and until the residue becomes black and thick. The receiver then contains a yellow thick vapour, and an oily liquor, in which brilliant particles of paraffin are observable by transmitted light. If the liquor has not acquired the proper state, it is to be obtained by repeated distillations, and the paraffin may be separated in two different modes.

The first consists in mixing and shaking the distilled liquor with alcohol of specific gravity 0.837. After standing a little time, there deposits from the turbid mixture, a viscid liquid mass, which is to be repeatedly washed with alcohol of the same strength, until it is converted into small colourless plates. These are then to be dissolved in hot absolute alcohol, and as the solution cools, paraffin separates in small white needles, and in small plates: in order to purify them perfectly, they may be redissolved in hot absolute alcohol, from which they separate on cooling.

The following is a better method: Distil the heavy oil of tar repeatedly, and mix it gradually with one tenth of its weight of concentrated sulphuric acid, adding this quantity re-

peatedly until the mixture has become entirely black and fluid; this action is attended with heat and the evolution of sulphurous acid. The oil requires from a quarter to a half its weight of acid. If the heat does not rise to 212° F. it must be raised to that degree artificially. The mixture is then to remain at least twelve hours exposed to a heat of not less than 124° F., in order that the paraffin may not congeal; it then is found as a colourless liquid on the surface. Decant this liquid, which is a compound of paraffin and a peculiar oil; or when all is cold, let it be taken off in a cake, break it, wash it with water, and press it in bibulous paper. By this method the oil is absorbed by the paper, and the paraffin remains in small scales, which are to be purified by solution in hot absolute alcohol: it may afterwards be melted into one mass, under hot water, and should then be colourless and transparent as glass, dry and slightly fusible, and make no greasy spot on bibulous paper.

Sometimes it happens that the combination of paraffin and oil does not separate properly from the sulphuric acid; in that case it is to be distilled; water, sulphuric acid, and an oil evaporates: as soon as the last thickens, it then contains paraffin, which is to be separated and treated as before, with sulphuric acid, alcohol &c. If this compound is not quite colourless, it is to be allowed to congeal, and treated with concentrated sulphuric acid; then, in order to purify it, it is to remain long in a warm place.

The properties of paraffin are, that at common temperatures it is hard, crystalline, perfectly white, inodorous, tasteless, brittle, its touch like that of cetine, ductile, but not easily uniting, streak greasy, a nonconductor of electricity, loses no sensible weight during months of exposure to the air, melts at about 111° F. into a colourless, transparent, oleaginous fluid, boils at a higher temperature, and afterwards evaporates in white vapour, suffers no change by distillation, and leaves no residue, becomes coloured only when combined with other organic substances. By the flame of a taper it fuses without burning; when heated in a platina spoon until it begins to evaporate, it will inflame in the candle, and burns with a pure

white flame without soot or residue. A match made with it, burns like a taper, without smell; bibulous paper rubbed on it does not absorb it; at common temperatures it has not a greasy feel. Its density is 0.870.

It has already been stated, that paraffin is so named on account of its indifference or slight affinity for other bodies. The following have not the least effect upon it: chlorine, whether in the state of gas or of solution; sulphuric, muriatic, nitric, acetic, oxalic, and tartaric acids; solutions of potash, ammonia, lime, barytes, strontian; the alkaline carbonates hydrate of lime, potassium even in fusion; deutoxide of lead and peroxide of manganese. Sulphur, phosphorus, and selenium do not fuse with paraffin; when mixed with it after having been fused, it appears to take up only a very small quantity. It does not combine by fusion with camphor, naphthaline, benzoin, nor pitch, but unites well with stearine, cetine, bees' wax, and colophony. Lard and suet melt with it, but separate on cooling. Olive oil, when cold, dissolves paraffin imperfectly, but readily when hot; oil of almonds acts more slowly. The oils of turpentine and tar, and naphtha, dissolve it readily, even when cold; 100 parts of ether dissolve 140 parts of paraffin at 77° F.; at a rather lower temperature it congeals into a white crystalline mass. Absolute alcohol dissolves but little when cold, and even this little is precipitated by water; alcohol when boiling dissolves only 3.45 per cent. of its weight, and the solution congeals on cooling. Test papers are not altered by the spirituous solution.

Paraffin appears applicable to several useful purposes. It gives better light than wax, and improves spermaceti for candles; it may be extremely useful as a cement, because it is not acted upon either by acids or alkalies; it may also serve to grease carriage wheels, &c.

Eupion is best prepared by the following process:—Put into an iron retort 14 pints (imperial) of fresh rough animal tar, prepared from flesh, bones, hoofs or horns, and draw off 8 $\frac{3}{4}$ pints; redistil and draw off only 5 $\frac{1}{4}$ pints; shake it carefully, and by small portions, with 18 ounces (avoirdupois) of sul-

phuric acid. By this there are obtained a red solution, and a subtile transparent liquid of a bright yellow colour; the latter being separated, is to be mixed in a retort with an equal weight of sulphuric acid, and three fourths are to be distilled. The colourless product is to be washed with a solution of potash, and after being some time digested, the oil is to be separated and again distilled with half its weight of sulphuric acid; distil again, wash with a hot solution of potash; decant, and then distil very slowly with pure water until three fourths pass into the receiver;—there then remains some paraffin still mixed with the eupion. The distilled eupion is to be put over sulphuric acid in the air pump for twenty-four hours; it is then to be distilled with a few grains of potassium, which occasions it to deposit some brown flocks of a red brown colour, which are to be separated; when after repeating this treatment it is no longer rendered turbid, but leaves the potassium of a metallic whiteness, it is to be decanted; it is not pure unless it burns without smoke, and its density exceeds 0.740. The eupion is separated from the paraffin either by distillation with a large quantity of water, because it is rather more volatile than paraffin; or by spirits of wine, in which paraffin is insoluble; or by extreme cold, which makes it crystallize. The distillation with water, when only the first portions are received, renders it entirely free from paraffin. By the processes which have been described, and with slight modifications, eupion is obtained from vegetable tar, and paraffin from animal tar.

The properties of eupion are the following: colourless, transparent as water, liquid even at 4° F., tasteless, inodorous, unalterable in the air, is a nonconductor of electricity, has no effect upon litmus or tumeric papers, is as fluid as absolute alcohol, forms drops at 68° F. 0.296 of the size of those of water, spreads very readily on glass, but rises in a glass tube only to 0.6207 of the height that water does, forms a spot upon bibulous paper, which disappears in time, but more readily when heated. Its density is 0.740; from 66° F. to 336°, increases about one fifth, boils at 336°, and volatilizes if it be pure. It does not inflame in a cup by a taper, but

readily when heated in a platina spoon, is readily fired by a match, with a bright flame without smoke, even when the flame is as long as the hand.

Eupion is perfectly insoluble both in hot and cold water; 100 parts of absolute alcohol at 65° F. dissolve 33 parts; but on cooling, a great part of the eupion separates. These two fluids, when hot mix in all proportions. Ether mixed with a tenth of eupion forms a clear solution, but with five times that quantity it is turbid; it becomes clear, however, on standing, during which water evaporates from the ether: acetic ether dissolves about one third of its weight of eupion: sulphuret of carbon, oil of turpentine, naphtha, oil of almonds and of olives, readily mix with this fluid even when cold. Eupion, when cold, readily dissolves chlorine, and bromine still more so; but heat separates these bodies without altering it. Iodine dissolves in it even in the cold with its violet colour, and much more readily when hot, and on cooling it crystallizes in part. Phosphorus, selenium, and sulphur dissolve readily in eupion when heated, but not when cold; on cooling, the two former precipitate totally, and the latter partially. Naphthaline, camphor, stearine, cetine, cholesterine, paraffin, and balsam of copaiba dissolve in it in the cold, and much more so when hot. Tallow dissolves in it at 80° F., but at 68° the solution becomes clotted, probably the stearine separates, and the elaine remains in solution. Bees' wax dissolves in eupion when heated, but the greater part separates on cooling. Colophony is partially soluble in the cold, but perfectly at a boiling heat. Benzoin, gum anime, copal, and gum lac, dissolve only partially at a boiling heat, and they precipitate either totally or partially on cooling. Caoutchouc swells in eupion in an extraordinary manner, yet does not dissolve in it in the heat of a stove, but readily at a boiling temperature. The solution does not dry by exposure to the air. Heated upon a plate of glass in a stove, it soon becomes adhesive, may be drawn into threads, and eventually dries. The caoutchouc remains as a brittle varnish, which may be scraped off in small scales like dried gum or varnish.

The following substances have no action upon eupion: con-

centrated nitric acid, concentrated sulphuric acid, muriatic, acetic, oxalic, tartaric, succinic, and citric acids; potassium, hydrate of potash, hydrate of lime, solutions of potash, lime, barytes, strontian and ammonia; the carbonated alkalies, deutoxide of lead, peroxide of mercury, peroxide of manganese, oxide of copper, bichromate of potash.

Eupion is an excellent substance for keeping potassium in, probably also for separating stearine for elaine; and is a most remarkable substance for giving light by combustion, giving no soot even when mixed with paraffin.—*Ann. de Chim et de Phys.* l. p. 69. & *Phil. Mag.*

Analysis of Paraffin.—M. Jules Gay-Lussac has analyzed this substance by means of oxide of copper, and obtained such quantities of carbonic acid and water as showed that it consisted of

Carbon	85.23
Hydrogen	14.99
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	100.22

These, he remarks, are in the same proportions as form olefiant gas; and he considers this compound as equivalent to one atom of carbon and two atoms of hydrogen; but adopting the atomic weights usual in this country, it is a compound of one atom of each, or of

Carbon	6	85.7
Hydrogen	1	14.3
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	7	100

Ann. de Chim. et de Phys. tom. xlix. p. 30. & *Phil. Mag.*

ART. XIV.—*On Lactucarium and Thridace.*

By A. CHEVALLIER.

THE use of the *LACTUCA sativa* in the healing art is very ancient, and may be traced back to Hippocrates: but like many other remedies, this article was successively employed and abandoned. At present two products are obtained from the

lettuce, viz. *lactucarium* and *thridace*. One of these, the *lactucarium*, was examined by Dr. J. R. Coxe, of Philadelphia, in 1792; the other has since been investigated by several French practitioners, who are by no means in unison as to its properties. This discrepancy may have arisen from the confusion which exists in the names applied to products which are not identical, and which are endowed with different properties. Thus Dr. Francis has given the name of *thridace* to the *lactucarium* of the English practitioners, which is a solid, flexible or frangible product, obtained by evaporation in the open air, of a white, bitter, viscous juice, which flows from incisions made in the stem of the lettuce, when it has acquired its full growth; whilst other practitioners have given the same name to an extract obtained by pounding lettuce leaves or stems, to obtain a juice, which is first formed into an extract, and then dried.

It may readily be supposed that these two products do not possess the same properties, and in fact, that they are wholly dissimilar. Whilst the juice which is concentrated by the air is very bitter, and has somewhat of the virous smell of opium, that obtained by expression &c. has very little bitterness, and even is sometimes salt. It is therefore necessary, that in future a distinction should be made between them. Hence it is better to retain the name of *lactucarium* for the concrete product obtained by spontaneous evaporation, from the white viscid juice that flows from incisions made in the *LACTUCA sativa*, and to give the name of *thridace* to the product of the evaporation of lettuce juice by means of heat.

In a letter from M. Baumann, of Saverne, he gives the following details: "I send you some *lactucarium*, which I procured by a very simple and easy method, as in six hours I was able to collect ten drachms of a product similar to that transmitted to you. This is not entirely soluble in water, forming an emulsion with that fluid. If this emulsion is permitted to remain undisturbed for some time, part of the product falls to the bottom; this when exposed to heat, burns like wax, leaving a carbonaceous residue.

M. Baumann's plan of procuring the *lactucarium* is as fol-

lows:—He cuts a quill in the form of a toothpick, which is passed through the cork of a wide mouthed bottle; he makes incisions in the lettuce, and collects the juice which exudes by means of the quill, which permits it to run into the bottle; this is then exposed to the heat of the sun, which evaporates the water and solidifies the lactucarium. The lettuce plants which have been punctured may be kept for the purpose of seed, as this operation does not prevent their producing as perfect seed as if they had not been wounded.—*Journ. de Chim. Med.*

ART. XV.—*On the Composition of Tartar Emetic.*

By R. BRANDES and C. WARDENBERG.

TARTAR EMETIC has often been subjected to chemical examination, but the results are by no means in accordance with each other. To settle this question the following experiments were made. The tartar emetic employed was prepared with very pure supertartrate of potassa, formed by adding an excess of tartaric acid to pure carbonate of potassa, dissolving in water and crystallizing. The oxide of antimony was prepared by treating metallic antimony with *aqua regia*, precipitating the solution with water and washing the precipitate with a weak solution of carbonate of potassa.

A first operation afforded from 740 grains of supertartrate of potassa and 478 grains of oxide of antimony, 1104 grains of crystallized tartar emetic. A second trial with 148 grains of supertartrate of potassa and 11.975 of oxide of antimony gave 259.5 grains of crystallized tartar emetic.

The analysis were made first on part of the tartar emetic of the first operation; second on another portion of the same; third on that of the second operation.

To determine the proportion of water, the salt was heated by steam, and afterwards in a sand bath. The quantity of oxide of antimony was determined by means of sulphuretted hydrogen. The sulphuret of antimony thus obtained, was washed with boiling water, then dried, and gradually

heated to redness. The quantity of anhydrous sulphuret served to determine that of the oxide.

The solutions still contained some sulphureted hydrogen; this was driven off by heat, and the fluid evaporated slightly, the excess of acid saturated with ammonia, and the tartaric acid precipitated by acetate of lead. The tartrate of lead thus formed was dried by heat, which was prolonged as much as possible, without decomposing the salt; the weight of this latter gave that of the tartaric acid.

The oxide of lead remaining in the solution was precipitated by sulphuric acid; the solution was then evaporated, and the product subjected to a strong heat; the quantity of the salt obtained was sensibly greater than was expected; but on dissolving it the reason of this became evident; namely, the sulphate of lead not being wholly insoluble in the acids; in fact, the solution became turbid, and deposited a small quantity of the sulphate of lead. Carbonate of ammonia was then added, the mixture filtered, evaporated to dryness, and the residue exposed to a red heat; when its weight served to determine that of the potassa.

The three analyses gave the following results on 100 grains of tartar emetic:

	I.	II.	III.
Oxide of antimony	43.2508	43.1825	43.0464
Potassa	13.7878	13.5174	13.6258
Tartaric acid	37.7257	37.7706	37.6821
Water	5.2357	5.5295	5.6455
	<hr/>	<hr/>	<hr/>
	100.000	100.000	100.000

The mean of these three analyses gives

Oxide of antimony	43.1599
Potassa	13.6346
Tartaric acid	35.4643
Water	5.4412
	<hr/>
	100.000

Hence the composition of this salt, as also stated by Dulk, may be represented as follows: $\text{K}^{\text{T}} \text{S}^{\text{B}} \text{T} \cdot 2\text{H}$. and its atomic weight 4389.194.—*Journal de Pharmacie, Sep. 1832.*

ART. XVI.—*Remarks on the Euphorbia hypericifolia.* By
WILLIAM ZOLLIKOFFER, M. D. of Baltimore.

THIS vegetable production, which is exclusively a native of the United States, arrested my attention in the year 1819; since that time my mind has not unfrequently been directed to an investigation of its therapeutic operation, and, in a very great number of instances, I have been delighted with the efficient displays of its curative influence in diseases which had previously resisted the use of the ordinary astringents, administered alone, and in association with opium; a circumstance that doubtless is attributable to some peculiarity in its mode of action, depending upon certain elements that exist in its composition, as furnished by nature, which, although individually inert, confer additional strength and impulse upon the principles of activity with which they are associated, that cannot be successfully effected by any attempt of art in imitation of the combined powers which it displays, aided by the application of the most minute knowledge in the possession of the profession, in relation to the important principles of medicinal combination.

Kino and catechu, with many other vegetable astringents which I have often prescribed individually and in conjunction with narcotics, in the maladies to which the separate and conjoint exhibition of these remedial articles are often competent to the production of the happiest results, sink into comparative insignificance when viewed with the successful impressions which accompany this plant in its modes of action, and in its ultimate consecutive displays, in accomplishing the important objects of its internal administration.

Medicinal consociations which are required to obviate different symptoms, or answer different indications, but by modes of action altogether opposed to each other, it is well known, should, in many instances, be had recourse to, in order to enable the physician to manage particular diseases with which he has to combat, with dexterous ability, with determinable promptness, and with ultimate success. Cases illustrative of

this position can very readily be adduced in attestation of the assertion, and in demonstrative elucidation of the nature and importance of such combinations. The following one will doubtless be considered sufficiently competent of itself for the establishment of this declaration. "In diarrhœa, an astringent, properly so called, diminishes the flow of those acrid fluids into the intestines, by which their peristaltic motions are preternaturally increased, and it consequently represses the diarrhœa; a narcotic under similar circumstances might not repress the flow of acrid matter to which I have alluded, but it would render the bowels less susceptible to its stimulus, and would therefore produce the same apparent alleviation, although by a very different mode of operation." It will readily be perceived that the restraining influence of the astringent is here displayed by the corrugating and consequent condensing power that it exerts on the intestinal canal; while the effect of the narcotic in diminishing the irritability of the intestinal organs, and subsequently checking the diarrhœa, is the result peculiar to its operation in allaying the sensibility of the sentient parts of the animal economy. By a consociation of these two agents, the practitioner avails himself at once of an important and decided advantage, in arresting the progress of this excessive evacuation, not only with the more promptness, than by the single administration of an astringent, but with the more certainty of preventing its immediate return; for the narcotic diminishing the quickness of the sensation of the bowels to the action of the acrid secretions, which are checked by the operative influence of the constringent agency of the astringent, until these secretions pass off by the rectum, greatly facilitates the effects of the latter medicinal substance, by its display of action in this way upon the sensibility. An astringent exhibited alone would be calculated to check the inordinate secretions, but these secretions would be reproductive of the diarrhœa, as a consequence of their irritating operation on the bowels; hence the necessity of the combined use of the remedies of the classes to which they belong, in order to insure the successful management of the malady that is here selected as the subject of illustration, in order to demonstrate

the nature and importance of medicinal combinations. It is to this double play in the remedial action of a narcotic associated in native combination with a powerful astringent, in the character of the *EUPHORBIA hypericifolia*, that gives to it the superiority it possesses over other analagous remedies, effected by medicinal combination, with a view of producing similar consequential results.

The *EUPHORBIA hypericifolia* delights in a rich and prolific soil, and is an inhabitant of gardens and other fertile situations. It is recognized by the common and local appellations of black pursely, milk pursely, milk weed, &c. MICHAUX, who doubtless was acquainted with its botanical character, has favoured the medical profession with the following description of its specific difference, by which it can very readily be ascertained from any other individual belonging to the genus *Euphorbia*. "*EUPHORBIA hypericifolia*; glabra, dichotome, ramossissima, erectiuscula-patula, ramis divaricatis, foliis oppositis, subfalcato-oblongis, argute serratis; ramusculis in summitate fasciculatim multifloris."

This species of *Euphorbia* is an annual plant that grows to the height of a foot, and is rather procumbent. It has a smooth stalk, which is repeatedly forked with divaricated branches. The leaves, which are opposite and oblong, are somewhat falciform and deeply serrated; these are often covered with purple spots. The flowers, which appear in August and September, are white, and situated in numerous quantities on the extremity of the small branches. This plant, of which I perceive there is another variety, belongs to the 11th class, dodecandria; the third order, trigynia, and the natural order, Tricoccæ of LINNÆUS, and *Euphorbiæ* of JUSSIEU.

Being rather dissatisfied with the result of a former chemical examination of this plant, I concluded to extend my investigation upon this subject somewhat further. I digested several portions of it, after having previously reduced it to a state of pulverization, in sulphuric ether and alcohol. The ethereal solution gave a precipitate upon the addition of alcohol. The alcoholic preparation assumed a pearly turbidness when water was added. Both the ethereal and alcoholic solutions upon

being evaporated, afforded a residuum that burnt with great vividness, and exhibited a flame much like that resulting from the combustion of spirits of wine. The infusion and decoction that were prepared from distilled water produced a copious precipitate when gelatine was added, and assumed a dark blue colour on the addition of the sulphate of iron. From these results we may justly infer, that the chemical composition of this plant consists of caoutchouc, resin, tannin, and gallic acid.

To the organs of gustation this vegetable substance produces an impression somewhat different from all of the other species belonging to the genus *Euphorbia* hitherto known. Its taste is sweetish; this is immediately succeeded by a sensation of harshness and roughness imparted to the palate, being too peculiar to be mistaken by even the most ordinary observer, who has ever attempted to eat a green persimmon. In its remedial character, it likewise differs very considerably from any other individual belonging to the same family of plants; so much so, that it seems to have been the prevailing opinion among practical and experimenting botanists, that all the species included in this extensive genus, *euphorbia*, possessed acrid and irritating qualities.

Relating more particularly to the therapeutic displays of the article that is the subject of this communication, I shall commence the notice of the diseases in which it has been exhibited with advantage, by first introducing dysentery as one of the examples in attestation of the remedial operation it exerts on the animal economy in removing diseased action, and in restoring the healthy condition of parts that are deranged in consequence of morbid excitement.

In this malady, when the true dysenteric symptoms have continued, after the inflammatory diathesis had been removed, by appropriate antiphlogistic means, I have been more successful with the use of this remedy, than with the conjoint administration of the ordinary astringents with narcotics. The evacuations have very soon become changed, both as relates to their character, condition and frequency; and the other unpleasant concomitant symptoms subside in a degree com-

mensurate with the recession of the unfavourable appearances of these evacuations. In most of the cases which I have treated with this remedy, I have been able to effect their removal in the course of forty-eight hours. In the primary stage of dysentery, I have never given it a trial, from a persuasion, that remedies of this kind are in direct contravention to its successful management.

The manner in which I have generally directed the *EUPHORBIA hypericifolia* to be used, is in the form of infusion, of the following strengths.—*R. Euphorbia hypericifolia folionem exsiccat. ℥ss.* To be infused in a pint of boiling water for half an hour. In dysentery I mostly direct a table spoonful to be given every hour until the morbid symptoms begin to yield; and then to be used less frequently. In diarrrhœa, this quantity should be taken after every evacuation. The quantity that I have used in menorrhagia and fluor albus, is that of a wine-glassful morning, noon, and at night. I have said nothing of the dietetical plan to be pursued in consociation with the administration of this plant, because this part of the management of the cases noticed in this communication, is always regulated by the knowledge the practitioner has in relation to the *materia alimentaria*.—*Amer. Jour. of Med. Science.*

MINUTES OF THE COLLEGE.

Nov. 27, 1832. The Board of Trustees reported the election of Isaac Jones Smith, as a resident member.

Dec. 25, 1832. The Board of Trustees reported the election of Richard M. Reeve, as a resident member, and Dr. James Cook, of Fredericksburg, Va. as an associate member.

The following resolution was adopted.—That all resignations from the Board of Trustees be presented to that Board, and referred to the College for acceptance.

In December 1831, a Committee of fifteen members was appointed, of which the president was chairman, to examine the several departments of the United States Pharmacopœia. This committee, through their chairman, made the following summary report:—

To the Philadelphia College of Pharmacy.

The chairman of the committee appointed to examine the American Pharmacopœia &c., reports that soon after their appointment that committee met and divided itself into subcommittees, assigning to each member some particular department of the Pharmacopœia, to which his labours were to be more particularly directed.

The resolution of the college, under which the committee stands appointed required that the reports of these subcommittees should be made to the chairman in the Ninth month, (September,) and that he should lay before the college at its present meeting a summary or digest of them.

In Medicine. To this requisition the chairman states, that he has only received reports from seven members, viz.: from Elias Durand, on syrups, honey and confections, and from Edward Needles, Wm. Hodgson, Jr., Thos. M'Clintock, Jos. Scattergood, Dillwyn Parrish and D. Stewart of Baltimore, on miscellaneous subjects which have attracted their attention. From the other members of the committee no reports have been received, although the pages of our Journal prove that the attention of several members of the committee of the college, has been directed to the subject.

In examining the reports which have been submitted, the chairman has felt some embarrassment as to the course which he should pursue in preparing this report. The subjects of remark in these communications are various—some of them relate to actual experiments, of which the results are given; some of them are the mere opinions of the writer, on the value of formulæ, and some are suggestions respecting the introduction of new preparations. As it might seem invidious in me to give my own opinion in opposition to, or judgment upon the opinions of others, I have concluded to lay before the college the original reports, and to content myself with pointing out those parts which appear to be the result of actual experiment.

The communication of Joseph Bringhurst cannot be considered as an examination of the pharmacopœia, although sent to the committee in consequence of the allotment to him of the department of the tinctures. Yet it is a report valuable in itself, and being accompanied by specimens of the extracts obtained, deserves particular notice and praise. Experiments of this kind, carefully conducted, are greatly to be desired, on all the details of pharmacy. He has given in relation to thirteen articles of the materia medica, the proportion dissolved by strong or diluted alcohol, and the increase of weights in the liquid, and the amount of extract which the tinctures thus prepared yielded.

The communication from our corresponding secretary, Elias Durand, gives the result of his experience in the preparation of syrups, to be in favour of employing the diluted tinc-

ture of medicinal substances, which are to be evaporated till the alcohol is nearly exhausted, and then mixed with the syrup previously prepared. The advantages of this mode of operation are obvious, but as the strength and qualities of the syrups thus prepared, must differ from those made in the ordinary method, it is respectfully suggested, that no opinion should be given by the college, on their comparative merit, without full and elaborate trial, both as to the best manner of preparing each syrup, and its medicinal qualities when prepared.

It is said in the same communication, that honey is decidedly preferable to sugar in the formation of conserves, on account of the liability of the latter to crystallize. The observation is no doubt correct, and may lead to improvements in the formula for these compounds.

The ointment of rose water is found by our secretary to be too hard, and he gives the following as the recipe used by himself, and as one of much better consistence:

Aq. Rosar		12 parts.
Ol. Amygdal	D.	16 parts.
Spermaceti		4 parts.
Cera Alba		1 part.

In the communication from Edward Needles, are some valuable remarks on the preparation of *Emplastrum Assafoetida*. The pharmacopœia directs the gum resin to be melted and strained, which it is not easy to effect. Our colleague macerates it in boiling water, so as to dissolve it, and pass it through a strainer; the watery solution is then evaporated to the consistence of syrup, and thoroughly mixed with the melted plaster. He extends the same method to the preparation of *Galbanum* plaster, and observes that the plasters thus made spread smoothly and easily.

He also observes, that the pharmacopœia is deficient in not directing the mode of preparing the pulp of *Cassia*, in the confection of *Senna*.

The report of Wm. Hodgson, Jr. notices a defect in the mode of preparing *Extract of Jalap*, which must have struck

all who have tried it. The boiling water directed to be used, dissolves the feculæ, and renders the process of straining extremely difficult. By infusing instead of boiling the root, this inconvenience is avoided, and the appearance and quality of the extract is much improved. His remarks on the *Mistura Ferri*, and on the preparation of *Morphia*, are valuable, and he points out the circumstances, by an attention to which, nearly all the narcotine can be separated from the salts of *morphia*, in the course of their preparation.

He also notices the difficulty of preparing the *Assafœtida* plaster by the officinal rule, and proposes to dissolve the gum resin in diluted alcohol, and afterwards to proceed in the same manner as is proposed in the report of Edward Needles.

Thomas M'Clintock, in his report, observes very judiciously, that the strengthening plaster of the pharmacopœia is liable to many objections. He proposes as a substitute, a composition nearly similar to the *Emplastrum Thuris*, of the Dublin college, which is one of the best preparations of the kind in use.

His remarks on the adhesive plaster and warm plaster, will be found judicious and interesting.

In the report of Dillwyn Parrish, he states, that he has found the *Ceratum simplex* becomes inconveniently hard in cold weather, and that he has found the following to be a formula better adapted to our climate:—

R. Axung.
Cera Alb.

$\overline{3}$ ix
 $\overline{3}$ iiij M

The communication from D. Stewart, of Baltimore, relates to the preparation of syrups of *Rhubarb*, respecting which I have already spoken.

In thus confining myself as nearly as possible to the selection of matter of fact criticism and experiment, I have been guided by the belief that the College of Pharmacy, however it may respect the opinions and suggestions of its members, will not accede to any change in the pharmacopœia without the most satisfactory proof that it is founded on just principles and actual experience, without subjecting the proposition to

the test of new experiments in the hands of a competent committee. The peculiar department of the college in this inquiry appears to me to be strictly pharmaceutical; the virtues of preparations—the strength of which it is most convenient or proper to compound them, although we are much interested in these points, lie in the more peculiar department of the medical profession. Although the views and suggestions of members on these subjects are interesting, yet it is respectfully suggested that the college abstain from acting upon them at the present stage of the business.

How far the Pharmacopœia is deficient as a complete code of pharmacy, is another point of great interest to the college. With every successive revision, and with the progress of pharmaceutic science in our country, it will, we trust, become more and more complete in this respect. In the meantime, something seems due to ourselves in relation to those formulæ which are not contained in it, and it is therefore proposed to appoint a committee to select and recommend to the college for adoption such formulæ, not contained in the Pharmacopœia of the United States, as they may judge useful from the Pharmacopœias of Europe.

It is further proposed to refer the reports herewith submitted to a committee, in order to select such parts thereof as they may deem useful, and that those parts which relate to practical remarks on the formulæ and modes of preparation of the U. S. Pharmacopœia, be also referred to a committee to examine and report on the same; all of which is respectfully submitted.

DANIEL B. SMITH, *Chairman.*

A committee was appointed to examine those parts of the reports which related to practical remarks on the formulæ and modes of preparation of the U. S. Pharmacopœia, to whom, in conjunction with the professors in the school of pharmacy, was also referred the subject of selecting and recommending such formulæ, not contained in the U. S. Pharmacopœia, as they may judge useful.

Resolved, That the committee on the pharmacopœia ap-

pointed in 1831, be continued;—to report at the meeting in December 1833.

A resignation having occurred in the Board of Trustees by the resignation of JOHN CARTER, CHARLES MARSHALL was unanimously elected to fill his place.

January 29th, 1833. The Board of Trustees reported the election of CHARLES BONSALE, of Germantown, as an associate member.

February 26th, 1833. A communication from Dr. JAMES COOK, of Fredericksburg, Virginia, was read and referred to the publication committee.

MISCELLANY.

Transparent Caustic Potassa.—Professor Ducatel of the University of Maryland, has lately remarked an unusual appearance in the spontaneous formation of caustic potassa. In a well stopped vial, containing about an eighth of its capacity of naphtha, used for preserving a few globules of potassium, which had remained in the laboratory untouched for nearly a year, the whole of the metal was found transformed into a hydrated protoxide, perfectly transparent; so as to have been, at first inspection, mistaken for pieces of flint glass, which had accidentally fallen into the vial. The naphtha, which originally seemed very pure, has remained quite clear. It is not recollected that a similar fact is mentioned, as having been observed by any chemical writer.—E. D.

Chemical composition of vegetable acids.—M. Matteuci, in a memoir in the *Bibliothèque Universelle*. Juin, 1832, concludes :

1. That acetic acid is not altered by contact with sulphuric acid, and that it is not converted into formic acid, even by the addition of oxide of manganese.

2. That in contact with chlorine, and exposed to solar influence, acetic acid is converted into hydrochloric acid, and into oxi-carburetted chlorine gas.

3. That bromine exercises the same action, and consequently there is a formation of oxi-carburetted bromine gas, but iodine does not possess this property.

4. That oxide of carbon, in contact with copper, decomposes the water, forming acetic acid and oxide of copper.

5. Finally, that oxide of carbon may be considered as a combination analogous to cyanogen in forming to distinct acids.—*Journ de Pharmacie*.

Hydrocyanate of Quinine.—M. Pezzina gives the following plan for making this salt :—Triturate well a drachm of pure crystallized quinine in a glass mortar, adding gradually three ounces of medicinal hydrocyanic acid, of a specific gravity of 0.900. After half an hour of trituration the turbid solution is to be poured in to a glass stoppered vial and set aside for two days, shaking it well from time to time. The quinine will thus be almost all dissolved, and the solution is to be filtered, when

it will be of a straw colour, having a strong smell of hydrocyanic acid, but having no action on litmus paper, its specific gravity will be 910. Each ounce contains twenty grains of quinine. It should be observed, that the trituration must be performed at a low temperature, keeping the mortar surrounded with ice, so as not to permit any disengagement of the hydrocyanic acid by the heat produced by the friction of the pestle. This preparation should be preserved with the same care as hydrocyanic acid. The dose is from ten to twelve drops.—*Journal de Chimie. Medicale, Sept. 1832.*

Note on the Crystals formed in Oil of Cubebs. By M. MULLER, Aix-la-Chapelle.—Vauquelin long since noticed among the constituents of Cubebs an almost concrete volatile oil, and the existence of crystals in it has been pointed out by Teschemacher, and their forms determined by Brooke. Their dominant form appeared to him to be a rhomboidal octahedron; but the chemical properties of this substance have not been investigated until undertaken by M. Muller.

This chemist, in distilling two pounds of powdered cubebs, obtained about two ounces of a thick and turbid oil, which became clear in a month, and deposited a white precipitate. It still, however, retained the consistence of a fixed oil. In attentively observing the deposite, he observed that it had a crystalline appearance; he decanted the oil, and treated the mass with alcohol, which effected a complete solution. By the spontaneous evaporation of this latter fluid, crystals were formed, some of which were a quarter of an inch in length. They had the following properties: they were in transparent quadrilateral rhomboidal tables, had a slightly pungent taste, and a smell of cubebs, which appeared to depend on the presence of some of the essential oil.

When heated over a spirit lamp they soon melted; at a higher temperature the liquid began to boil, and finally volatilized in the form of thick white smoke, which, on cooling, gave rise to crystals. They are readily soluble in alcohol, and the solution is neither acid nor alkaline. Sulphuric ether dissolves them as easily as alcohol; cold water has no action on them, but when heated in contact with that fluid, they are changed into oleaginous drops, which crystallize on cooling. They dissolve rapidly in spirits of turpentine, as well as in fixed oils, especially with the aid of heat.

Diluted acetic acid when cold has no action on them, and if heat be applied they melt, but are not dissolved. When they are agitated with concentrated acetic acid, they afford a solution, which is at first limpid, but on the addition of more crystals the solution becomes turbid, and oleaginous drops are separated which rise to the surface, preserving their liquid form for a long time; if the acid, however, be neutralized, crystals are rapidly formed.

Liquid ammonia and a solution of caustic soda, unaided by heat, have no action on these crystals; but if the mixture be heated and shaken, a turbid liquid is formed, which, on cooling, deposits the substance in a crystalline form.—*Annalen der Pharmacie and Journal de Pharmacie.*

Protocarbonate of Iron.—According to Moldenhawser, the following process will afford a protocarbonate of iron of excellent quality: A solution of pure protosulphate of iron is to be mixed with a solution of carbonate of ammonia as long as any precipitate is formed, and the bottle in which it is made must be filled to the neck with boiling distilled water. When the precipitate has perfectly formed, the supernatant fluid is to be decanted, and the precipitate washed several times with distilled water, and afterwards put in a strong linen cloth, previously moistened with ether so as prevent any developement of caloric that might favour the super-oxidation. The whole is then submitted to the action of a press, and the distillation perfected in vacuo. The carbonate resulting from this process is of a whitish green.—*Geiger's Mag.* 30, and *Journ. de Chim. Med.*

Protocarbonate of Iron.—Folix has given another process for this preparation. Several parts of protosulphate of iron are to be dissolved in pure water; this solution is then to be boiled for some time with iron filings to separate all the peroxide; it is then to be filtered through a covered funnel into a bottle with a long neck; and four parts of pure carbonate of potassa dissolved in boiling water must be added to the clear solution, and the bottle being afterwards filled with pure boiling water and closed. When the whitish gray precipitate has fully formed, the fluid is to be poured off and the precipitate rapidly transferred to another bottle containing boiling water, which is to be immediately corked. This operation is to be repeated as long as the water retains any taste; the precipitate is then to be washed with alcohol, the introduced into a small tubulated retort, to which is to be adapted a strong bottle having a narrow neck. By means of water almost at the boiling point, or what is better, by a spirit lamp, a portion of the air in the bottle is driven off, when the apparatus is to be luted, a gentle heat is now to be applied to drive off the alcohol. The bottle should be cooled from time to time with water. The protocarbonate of iron thus obtained is of a blackish green, insipid, soluble in the acids, particularly in the hydrochloric, with great effervescence. Thirty grains of this product contain nine grains of carbonic acid, whilst that prepared according to the process of Buchner does not contain more than four grains. Even exposed to the action of the air, it retains its colour for a long time.—*Brandes. Archiv.* 37, and *Journ. de Chim. Med.*

Caustic Potassa.—The best method of preparing this article, according to J. Liebig, is to dissolve the carbonate of potassa in at least ten parts

of water. According to Berzelius, the lime should be added very gradually, waiting till each portion is changed into a sandy dust, which precipitates. If the above mentioned quantity of water be used, (and more would be better,) at least two parts of quicklime to three parts of carbonate of potassa are to be employed.*—*Journ. de Chim. Med.*

Creatine.—M. Chevreul has given this name to a new substance, which he has discovered in the flesh of animals. It is white, inodorous, insipid, crystallizes in small cubes, which are aggregated like those of the chloride of sodium. It has no action on litmus or syrup of violets, is insoluble in alcohol, soluble in water, and sulphuric acid. It is decomposed by heat, affording ammoniacal products, and a smell of hydrocyanic acid. This principle is obtained from the aqueous extract of meat, treated by alcohol, which dissolves the salts and osmazome. It remains mixed with an extractive matter, from which it can be separated by crystallization. It exists in flesh in a very small proportion, and although insipid, it appears to communicate a pleasant sweet taste to the extract of meat.—*Journ. de Chim. Med. Sept. 1832.*

New Adhesive Plaster.—M. Deschamps of Avallon, states that the following adhesive plaster is better than the resinous for the purpose of closing wounds, &c. It is prepared by fixing a piece of fine muslin, silk or linen, to a table, and giving it a thin coat of flour paste; when this is dry two coats of colourless gelatine are to be applied. It is only necessary to moisten this adhesive plaster to enable it to stick with great firmness. The inventor states that court plaster prepared in this manner, is far preferable to any other.—*Ibid.*

Morphia.—A pharmacist, at Venice, of the name of Galvini, has given the following method of obtaining pure morphia. A pound of powdered opium is to be subjected to five successive infusions: 1st, in alcohol, at 36°; 2nd, in do. at 24°; 3rd, in do. at 20°; 4th, in do. at 18°; and 5th, in boiling water. The five infusions are added together, filtered and distilled to separate the alcohol; the liquid, when thus reduced to two pounds, is to be united to an equal quantity of water. The mixture becomes turbid and is to be filtered, which will separate all the resin as well as the morphia and narcotine. This resin is to be washed, and the united liquids are to be boiled for half an hour with three ounces of calcined magnesia. The liquid, when cold, is to be filtered and again boiled

* *Note*. The importance of the relative quantity of water, in producing the causticity of the potassa or soda, when made by lime, was noticed by Descroizilles. This ingenious manufacturer mentions in his treatise on alkalimetry, that the proper proportions for the potash and soda of commerce, marking 75° to 64°, are at least seven times the weight of water, and 0.4 at most (less than half their weight) of lime.

with another ounce and a half of magnesia. The two precipitates are added together and dried, and three times treated with alcohol at 40°. By this means an ounce of perfectly pure, crystallized, and almost colourless morphia is obtained.

The narcotine can be extracted from the resin by treating it with hot diluted sulphuric acid; the solution filtered and treated by a solution of potassa, gives a precipitate of impure narcotine, which is to be redissolved in sulphuric acid and precipitated by ammonia. The product, washed and dissolved in alcohol at 24°, will afford on evaporation crystallized narcotine.—*Ibid.*

Mode of depriving Alcohol of Odour.—This is by means of the manganate of potassa. This salt is prepared by melting a mixture of six ounces of pure nitrate of potassa and two ounces of peroxide of manganese in a crucible. When cool, the mixture is put in a still with twenty-five measures of brandy or other alcoholic liquid, heat applied, when the product obtained will be entirely without smell.—*Ibid.*

Chlorides of Sulphur.—Thompson was the first who discovered the combination of chlorine and sulphur in 1802, since which, Berthollet, Jr., Bucholz, Davy, Henry Rose, &c. have occupied themselves with this compound, which is sometimes red and sometimes yellow. Notwithstanding this, a majority of chemists recognise but one chloride of sulphur, although Rose had stated that the red chloride contained an excess of sulphur. To determine this question M. Dumas prepared the two chlorides in a state of the greatest purity in order to analyse them, and obtained the following results:—

Yellow Chloride.—This must be considered as a protochloride composed of

Sulphur, 1 atom	201.16	47.6	
Chlorine, 1 atom	221.32	422.48	52.4 100

or,

1 volume vapour of sulphur	2.218	} 1 volume of protochloride 4.658.
1 volume of chlorine	2.440	

Red Chloride.—This must be considered as a bichloride composed of

Sulphur, 1 atom	201.16	31.2	
Chlorine, 2 atoms	442.64	643.80	68.8 100

or,

$\frac{1}{2}$ volume vapour of sulphur	1.109	} 1 volume of bi-chloride 3.549.
1 volume of chlorine	2.440	

The bichloride of sulphur corresponds to the hyposulphurous acid; but the protochloride has no analogy to any known compound of sulphur with oxygen.

M. Dumas has ascertained that these two chlorides absorb ammoniacal gas, and that one of them is thus converted into a purplish powder.—*Ibid.*

Protoxide of Azote.—M. Serullas gives the following method of preparing a solution of protoxide of azote, which has been recommended as a diffusible stimulant of great power.

A certain quantity of crystallized nitrate of ammonia is to be introduced into a vial, to which a curved tube is to be adapted; the vial is then to be heated, when the gas will be extricated; the free end of the tube is then to be introduced under a bottle filled with water and reversed; when this is about half filled with the gas, it is to be corked under water, removed and well shaken, again uncorked under water, and replaced over the tube. This is to be repeated until the water will absorb no more of the gas. The bottle is to be kept well corked.—*Journ. de Chime. Med.* July 1832.

New Manna from Australia.—One of the species of *EUCALYPTUS* produces a manna, whose remedial properties have been tested in New Holland. This substance does not appear to differ materially from that of the ash. It is, however, less nauseous. It is evidently the result of a rupture in the tissue of the bark of the tree, not induced by the punctures of insects, but by the action of the atmosphere, for it is only produced during the dry season, and the quantity depends on the degree and duration of the heat. After a long drought, it is to be met with in such abundance, on the ground, under the trees, that several pounds may be collected in a few minutes; but when the rainy season commences, it melts and disappears. The tree which furnishes this product, is but little known; it belongs to the natural order of *MYRTACEÆ*, and has received the name of *EUCALYPTUS mannifera*. It is found on elevated spots near the Blue mountains, and attains the height of from thirty to forty feet. Its trunk is of an irregular form, and has but few branches. As in all the other species of the genus, the leaves are simple, lanceolate and entire, and placed vertically, from the peculiar manner in which the branches are twisted.—*Courier des Etats Unis*.

Manufacture of Potashes.—At a late meeting of the Philomathic society, M. Becquerel mentioned some experiments he had made on the manufacture of potashes, at Charmes. The comparative analysis of a great variety of ashes, demonstrated to him, that those of green wood gain a much larger saline mixture of subcarbonate and sulphate of potassa. The proportion of the former varies from 0.45 to 0.65; it is this variation that causes the great differences in quality and price of the potashes of commerce. It is therefore of no slight importance, in the manufacture of potash, to separate the sulphate with which the subcarbonate is mixed. M. Becquerel has accomplished this, by concentrating the solution to 40° of Baume, and then letting it cool; the greatest part of the sulphate of potash crystallizes, and the salts remaining in solution contain 0.90 of subcarbonate. M. Becquerel has also ascertained, in his numerous analyses

of cinders of different kinds, that the ashes from lime kilns contain very little sulphate of potassa. This is no doubt owing to the action of the quicklime on the sulphate of potassa, through the intermedium of the charcoal. This fact, says M. Bacquerel, may be of some importance, and it may be found advantageous to sprinkle the wood intended to be burnt to make potash, with quicklime.—*Journ. de Pharm.* Oct. 1832.

Kermes Mineral.—M. B. Biozi has proposed the following method of preparing the kermes mineral: Take three parts of pure subcarbonate of potassa, boil them for half a hour with an equal portion of hydrate of lime and a sufficient quantity of water, observing, however, that the solution be reduced to one tenth of the water employed. The solution being filtered, seven parts are to be taken and the eighth reserved. These seven parts are to be diluted with a quantity of water equal to six times the weight of the carbonate of potassa employed. When the mixture begins to boil, add one part of sulphuret of antimony in fine powder, and twenty minutes afterwards filter the liquid; on cooling nothing is deposited; when distilled acetic acid is to be gradually added, the mixture being constantly stirred. The first precipitate formed is redissolved, but as the alkali becomes saturated the precipitate becomes more and more abundant. The kermes obtained by this first operation is in the form of a yellowish brown hydrate; the portion of the solution of potash which had been set aside is now to be added, and the mixture stirred; in twelve hours the kermes begins to assume its usual beautiful colour, when the solution is to be filtered and the precipitate well washed and dried.—*Journal de Chimie Medicale*, Sept. 1832.

Caoutchouc.—Few persons are perhaps aware of the comparatively late introduction of Indian Rubber into this country. The following notice is appended by Dr. Priestley to the preface to his *Familiar Introduction to the Theory and Practice of Perspective*, printed in 1770; and it will be observed that no name is given to the substance described: "Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black lead pencil. It must therefore, be of singular use to those who practise drawing. It is sold by Mr. Nairne, Mathematical Instrument Maker, opposite the Royal Exchange. He sells a cubical piece, of about half an inch, for three shillings; and he says it will last several years."—*Phil. Mag.*

Peroxide of Barium.—The hydrated peroxide of barium employed to prepare peroxide of hydrogen, may be obtained, according to M. M. Wöhler and Liebig, with the greatest facility by the following process. Heat caustic barytes in a platinum crucible, by means of a spirit lamp, until it is nearly red hot, and then throw in, by small quantities at a time, chlorate of potash; incandescence takes place, and the protoxide becomes per-

oxide of barium. When the mass is cold, dissolve the chloride of potassium by solution in cold water; the peroxide becomes a hydrate during this operation, and remains in the state of a white powder. It may be dried by exposure to the air, without heat. It appears to contain six atoms of water.

The yellow oxide of lead, fused with chlorate of potash, is readily converted into peroxide. Green oxide of chrome, treated in the same manner, gives neutral chromate of potash, attended with a copious evolution of chlorine.—*Ann. de Chim. et de Phys.* tom. xlix. p. 30. & *Phil. Mag.*

Hydrate of Phosphorus.—M. Pelouze states, that this matter, which was supposed to be hydrated oxide of phosphorus, is white, insipid, and insoluble in water. Its odour is similar to that of phosphorus, and it is also luminous in the dark. Its density is 1.515 at 60° F.; when put into contact with cold sulphuric acid, it is decomposed, giving its water to the acid, and the phosphorus is set free.

At a temperature of 110° F. and even a little under, the hydrate of phosphorus decomposes also into phosphorus, which appears with all its physical and chemical properties, and water. It does not contain more oxide than phosphorus which has been distilled, and is perfectly transparent.

In order to determine the quantity of water contained in this compound, it was dried on filtering paper, and heated in a weighed tube placed in water heated to 112° F. The water was absorbed by paper, and found to amount to 12.53 per cent. A compound of four atoms of phosphorus and one atom of water would consist of

Phosphorus	87.48
Water	12.52
	<hr/>
	100.00— <i>Ibid.</i>

Improvement in the quality of Iron and Steel.—An eminent London cutler, Mr. Weiss of the Strand, to whose inventions modern surgery is under considerable obligations, has remarked, that steel seemed to be much improved when it had become rusty in the earth, and provided the rust was not factitiously produced by the application of acids. He accordingly buried some razor blades for near three years, and the result fully corresponded to his expectation; the blades were coated with rust, which had the appearance of having exuded from within, but were not eroded, and the quality of the steel was decidedly improved.—*Phil. Mag.*

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ORIGINAL COMMUNICATIONS.

ART. XVII.—*Remarks on Digitalis.* By WATSON J. WELDING.
(*Extract from Inaugural Thesis.*)

ALTHOUGH this plant is not a native, it is cultivated in this country to some extent, as well for medicinal purposes as for its intrinsic beauty. The seeds should be sown as early as possible, after the commencement of warm weather, that the plants may attain sufficient vigour to withstand the severity of the winter; being a biennial it does not flower till the second season. This plant succeeds best in a light soil and dry situation, where it can receive the full influence of the sun's rays.

It flowers in July, at which time the leaves should be gathered for medicinal purposes. These are to be immediately dried in the sun, or in a warm room, after having previously deprived them of their footstalks and midribs, which are comparatively inert, and are apt to become mouldy. When thoroughly dry, the leaves should be kept in close drawers or tin cases. If sufficient care has been observed in drying, they will have strong, but not unpleasant odour, and present a fine green colour.

The greatest part of the *Digitalis* used in this city, is obtained from the Shakers, of Lebanon, in the state of New

York. It is cultivated in large quantities by them, but is often in a mouldy state, from its being packed before it has been perfectly dried, and hence becomes deteriorated.

It is the practice in some shops, to keep a considerable quantity on hand, in the state of powder; this plan is a bad one, as the digitalis thus loses much of its strength, and will disappoint the expectations of the physician. Only a small portion of this and similar articles should be kept in a powdered form, and in well stoppered bottles, secluded from the light.

Digitalis imparts its peculiar properties to cold or hot alcohol, and to boiling water. The decoction or infusion reddens litmus paper, and is precipitated by the salts of iron, of a black colour; by the nitrate of silver of a yellowish white; by the sulphate of copper of a greenish brown; by the sub-acetate of lead of a yellow, and by lime of a brownish green. The nitric, hydrochloric and sulphuric acids also produce precipitates.

Alcohol added to the decoction, renders it of almost a jelly-like consistence, probably owing to the mucilage it contains.

On distillation with water, a very small portion of volatile oil was obtained, (not more than one or two minims from two ounces of digitalis,) nearly colourless and of about the same density as water. As the vapour of the water condensed, it deposited a whitish flocculent substance, at first in such minute quantities, that I was unable to collect it. It possessed the peculiar odour of the leaves in a very high degree, and was volatilized in the course of three or four days, by exposure to the air; afterwards the deposit was of a whitish colour, and of a concrete form; this remained floating in the water, giving it a peculiar sweetish and slightly aromatic taste. It was, however, in so small a proportion, that I found it impossible to separate it from the filter.

Four hundred and eighty parts of the leaves, yielded one hundred and twenty of watery, and twelve of alcoholic extract; the first was of a reddish brown colour, and of a pillular consistence; the latter had an unctuous feel, and a nauseous, slightly bitter taste, was of a dark colour in the mass, but of

a beautiful sap green when in thin laminæ, being principally composed of fatty matter, in combination with the chlorophylline.

Inversely, the product was one hundred and sixty parts of alcoholic, and fifteen of watery extract. The former was of a deep blackish green colour in mass, of a pillular consistence, having a peculiar smell, and a bitter nauseous taste. The latter was of a light reddish brown colour, and had a sweetish, mucilaginous flavour, leaving, however, a rather unpleasant taste in the mouth.

By digesting the leaves in alcohol, evaporating to dryness, boiling in distilled water with some pure magnesia, for a considerable time, until the liquor was nearly colourless, then filtering, washing the precipitate with distilled water, drying, treating with boiling alcohol, and again evaporating, a brownish coloured, semitransparent mass was obtained, of a very bitter unpleasant taste, and having an alkaline reaction on litmus paper, previously reddened by an acid.

By digesting in alcohol as before, evaporating to dryness, boiling in distilled water with protoxide of lead to neutralize any free acid, filtering, evaporating to dryness, treating the residue with ether, at a moderate heat, and evaporating, a substance of a light greenish brown colour, remaining in a soft adhesive state when exposed to the air, was obtained. It had a slight odour, and an extremely bitter permanent taste, possessed alkaline properties, neutralizing several of the acids, but was uncrystallizable either alone or in combination.

From experiments upon the leaves, I believe they are composed of, 1st, gallic acid; 2d, mucilage; 3d, reddish brown colouring matter, soluble in water, insoluble in alcohol or ether; 4th, chlorophylline; 5th, saccharine matter; 6th, a trace of starch; 7th, volatile oil; 8th, concrete flocculent substance; 9th, gluten; 10th, fatty matter; 11th, extractive matter; 12th, lignine or woody fibre; 13th, a peculiar principle soluble in alcohol and ether.

ART. XVIII.—*Improved Syphons*, by R. HARE, M. D. *Professor of Chemistry in the University of Pennsylvania.*

SUBJOINED are engravings of two Syphons, which I have found useful in my laboratory. Of these, one represents the more complete method of execution; the other, that which can be more easily resorted to by Chemists in general, who have not easy access to skilful workmen.

The construction last alluded to, is represented by fig. 1. A cork is perforated in two places parallel to the axis. Through one of the perforations, the longer leg of the syphon passes; into the other, one end of a small lead tube is inserted. In order to support this tube, it is wound about the syphon until it approaches the summit, where a portion, of about three or four inches in length, is left free, so that advantage may be taken of its flexibility, to bend it into a situation convenient for applying the lips to the orifice. About the cork, the neck of a stout gum elastic bag is tied air tight. The joinings of the tubes with the cork, must also be air tight. The lower half of the gum elastic bag is removed, as represented.

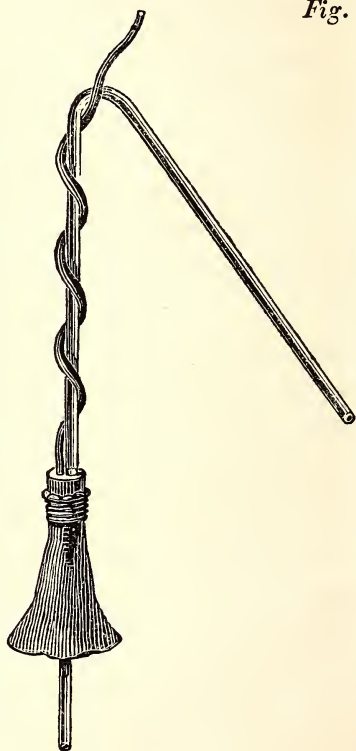


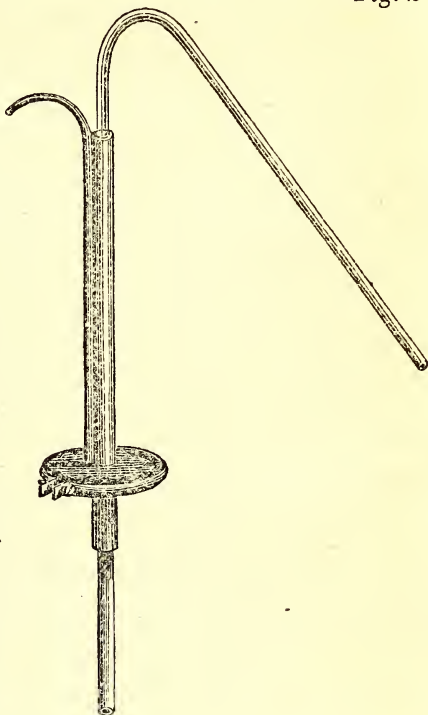
Fig. 1

In order to put this syphon into operation, a bottle must be used, having a neck and mouth of such dimensions as to form an air tight juncture with the bag when pressed into it. This object being accomplished, the air must be inhaled from the bottle, until the diminution of pressure causes the liquid to come

over, and fill the syphon. After this, on releasing the neck of the bottle, the current continues, as when established in any other way.

Fig. 2

Fig. 2 represents the more complete construction. In this are two metal tubes, passing through perforations made for them in a brass disk, turned quite true. Through one of these tubes, which is by much the larger, the syphon passes, and is cemented air tight. The other answers the purpose of the leaden tube described in the preceding article. The brass disk is covered by a piece of gum elastic, which may be obtained by dividing a bag of proper dimensions. The covering thus procured, is kept in its place by a brass



band or clasp, made to embrace both it, and the circumference of the plate, and to fasten by means of a screw.

Before applying the caoutchouc, it was softened by soaking it in ether, and a hole, obviously necessary, was made in the centre, by a hollow punch.

There is no difference between operating with this syphon, and that described in the preceding article, excepting that the juncture of the syphon with the bottle, is effected by pressing the orifice of the latter against the disk covered with gum elastic.

ART. XIX.—*Note on the Preparation of Phosphurets of Lime.*
By DANIEL B. SMITH.

HAVING experienced much difficulty in preparing phosphuret of lime, in the mode usually directed in the treatises on chemistry, I have latterly made it in the following manner, with complete success.

In place of a tube eighteen inches long, and an inch in diameter, I take the neck of a broken gallon or half gallon retort, and close it at the smaller end. The glass is then coated with fire clay, which is allowed to become perfectly dry. I take the dome of one of the ordinary clay furnaces, and support it in an inverted position so that the lower part shall be six or eight inches above the brick floor or pavement. Two or three ounces of phosphorus are then put in the bottom of the retort neck, and the space above filled with small fragments of well burnt lime, the top being covered with powdered lime. Thus prepared, the retort neck is placed in the inverted dome with its closed end resting on the pavement, and a charcoal fire kindled around that part which is in the dome. When this is at a red heat, a few coals are placed on the pavement, which soon evaporate the phosphorus, and the process is completed. This is a trifling matter to put in print, but the increased diameter of the part of the neck which contains the lime, enables the latter to combine with the phosphorus as fast as it is volatalized, so that several ounces of phosphorus may thus be converted into phosphuret at one operation without the slightest escape of the inflammable vapour.

ART. XX.—*On some Chemical Arts known to the Aborigines of North America.* By JACOB GREEN, M. D. *Professor of Chemistry in Jefferson Medical College.*

No one who examines the vast ruins of ancient buildings, and other curious relics of the people who once inhabited the banks of the Ohio, the Mississippi, and many other of our

western waters, can resist the conviction that they were a race greatly superior in the arts of civilized life to the Indian tribes who now wander there. The skill of this mysterious and extinct people, in pottery, and in sculpture, as well as the beauty and symmetry of many other articles fabricated by them, has frequently been noticed by the American antiquary; but I am not aware that any author has stated that they were familiar with the art of manufacturing and of colouring glass.

Some rude processes of vitrification were undoubtedly known at very remote periods of time. The word translated *crystal*, in the Book of Job, xxviii. 17, is thought by many critics to refer to glass—at any rate, we know that ornaments of this substance were made before the epoch of the interesting story related by Pliny, respecting its accidental discovery by the Phœnician sailors. Several of the mummies taken from the catacombs near Memphis, which were probably embalmed 1600 years before the Christian era, were decorated with beads of glass. Glass beads of a blue colour have been found in the Druidical barrow of Stonehenge; even glass lachrymatories have been discovered in the tombs of the ancient Greeks, and many varieties of stained glass, taken from the ruins of Pompeii, were analyzed by Sir Humphrey Davy. These facts sufficiently prove that this substance was known to different nations, and at very remote ages.*

With regard to the colour of glass, some tint of blue appears to have been not only the most frequent, but also the most highly prized. No colour, perhaps, is more readily given to it than blueish green, or the colours imparted by copper. Almost all the ancient greens and blues examined by Davy were derived from copper. The blue pigment scraped from the painted walls of the baths of Titus, was found by him to be a *frit* composed of alkali and silica, fused with a quantity of the oxide of copper. The blue glass beads taken from the Egyptian mummies analyzed by Klaproth and other chemists, were ascertained to be coloured with the oxide of

* Glass, with the ancients, was used as an article of luxury or ornament; it is only in modern times, that it can be said to be a useful substance.

copper.* So well acquainted were the ancient Greeks and Romans with the various tints of blue derived from copper, that Vitruvius distinctly states the process; he says, "they are made by heating together sand, alkali, and filings of copper." Much more might be advanced to prove that *blue glass* was known, and might be very easily manufactured, in a remote and rude state of the arts; our present object, however, is only to mention a few facts, which appear to us as conclusive evidence that the aborigines of our country possessed this knowledge.

Among the Indian antiquities in "Lambdin's Pennsylvania Museum" at Pittsburg, I noticed, a short time since, a number of large beads of a greenish blue colour. The glass which composed them was slightly translucent, and not perfectly vitrified. They seemed to have been perforated by some sharp instrument, and differed in other respects, from those of modern European manufacture, now and for a long time so common among the Indians, that I was induced to inquire the particulars of their discovery. Mr. Lambdin informed me that they were found by himself, in excavating an ancient Indian mound near the banks of the Ohio. He showed me some of the crumbling bones of the skeleton which they probably once decorated, and a number of stone axes, arrow heads, pipes, and fragments of earthenware, taken from the same tumulus. These particulars convinced me that the relics must have belonged to one of the "ancients of the West," who flourished in these fertile and once thickly settled regions long before the voyage of Columbus. There can be no doubt that these beads were found as just described; but the question may arise, might they not have belonged to our present race of Indians? It has been said, though I have never seen it clearly proved, that our Indians sometimes bury their dead in the ancient mounds; and hence these glass beads may be of European origin. But the discovery of the pipes, axes, and earthenware deposited with them, removes all doubt;

* In the Philadelphia Museum there is an ancient Egyptian figure, of a light green colour, which is no doubt occasioned by the peroxide of copper, which always forms a green tint with carbonic acid and silica.

for these articles were certainly made by the people who constructed the mounds.

With great liberality and kindness, Mr. Lambdin presented me with some of these beads to analyze, and with very little trouble or skill, they were found to be composed, like similar ornaments on the Egyptian mummies, of copper, silica, and an alkali.

On exposing a small fragment of one of the beads on a piece of charcoal, to the flame of the common blowpipe, it *instantly* melted into a red globule; thus indicating the presence of a large quantity of alkali, and of the protoxide of copper. The alkali, I suppose to have been potash, for it is not probable that barilla could then be obtained, at so great a distance from the sea coast. Another fragment was pulverized, and fused in a platinum spoon, with about an equal weight of carbonate of potash; muriatic acid was then poured on the mass, in a test tube, the colouring matter was quickly dissolved, and the silica precipitated. On plunging the point of a penknife into the coloured solution, metallic copper was precipitated upon it, and on adding ammonia, the bright blue tint thus produced, proved that an oxide of copper was present.

That the discovery of glass must have happened by some such accident as the one related by Pliny, seems quite certain, and why might not this accident have occurred in America as well as in Europe? The conditions necessary for the formation of blue glass, must have been constantly occurring to our aborigines, if, indeed, they did not bring the art with them from the country from which they emigrated. Their familiarity with silex, and with native copper, and also with the use of intensely heated furnaces, is well established.* Nothing, therefore, could be more likely to occur occasionally than a *slag of blue glass*; and I have been so fortunate as to meet with what I suppose to be a slag of this kind, in the cabinet of Mr. J. Dobson, of this city. He informs me that it was

* Some of the vessels dug from the ancient mounds, have on them marks of fire; they bear as great a heat as the pots now used in glass manufactories, and are made of the same kind of clay—they are therefore supposed by Mr. Atwater to have been used as *crucibles*. See *Archæologia Americana*—p. 228-9.

found in the gold region, near the Chastetee river, which separates the Cherokee territory from the upper part of Georgia. This district of country is so remote from the ordinary intercourse of civilized life, that we cannot for a moment imagine this slag to be of recent origin. Indeed, some of our most acute mineralogists have pronounced it a native mineral. On analysis, however, it proved to be *blue glass*, very similar in constitution to the beads. On presenting to my friend, Professor Del Rio,* a piece of this slag, and a portion of one of the beads, the following results were obtained by him. "The bead, when submitted to the blowpipe on charcoal, without any flux, easily fused into a small red globule, proving that it contained the protoxide of copper in a large quantity. The fragment from Georgia contains a large portion of silica, and was more difficult of fusion. But when submitted to the blowpipe, with microcosmic salt, it melted into a whitish bead, which only on the addition of tin, exhibited the characteristic colour of copper."

Before closing this paper, a few remarks on some other colours used in painting by the aborigines of the west may be interesting.

We are informed, by Mr. Atwater, that the celebrated "*triune vase* found in an ancient work on the Cumberland river, is painted with various colours. One of the faces on the vase is marked with broad streaks of *yellow* round the eyes and ears—the other face with *reddish brown*, and the third is entirely covered with *vermilion*, or some paint resembling it;" brighter spots of the same tint are also on the cheeks and chin; he adds "that though these colours have been exposed to the damp earth for many centuries, they have notwithstanding preserved every shade in all its brilliancy." The vessel is composed of fine clay, rendered hard by the fire. The yellow and reddish brown, were no doubt produced by *iron ochres*—fragments of very remote antiquity. Davy discovered that the yellows in the Aldobrandini picture were all ochres;

* Professor Del Rio, it will be recollected, discovered in the brown lead ore of Zimapan, the new metal now called by Berzelius, vanadium.

those also on the pictured walls of Pompeii proved to be red and yellow ochres. The red paint on them was probably *minium*, or *red lead*, and not vermilion. Minium is a very ancient colour. Pliny says, lead was first converted into this red paint by a fire which occurred at Athens. We now find in many of the tumuli on the banks of the Ohio, portions of lead. The red colour on one vase, might also have been produced by an iron ochre, subjected to heat. Red clays are indeed now used by some Indian tribes for painting the face.

The *blacks* and the *browns*, so often noticed on the earthenware from the mounds, are all derived from carbonaceous matter.

The *white paint* now employed by our present race of Indians, is pipe clay;—the same substance was, no doubt, used by the “ancients of the west.” Several white clays were employed in painting by most ancient European artists—fine aluminous clay, and fine chalk, were ascertained by Davy to form the white colours of the Aldobrandini picture.

From the facts which have now been stated, it follows that the aborigines of North America, were acquainted with some of those chemical arts, which in Europe, in after ages, were the foundation of chemistry as a science.

ART. XXI—*Remarks on Extemporaneous Pharmacy.* By

THOMAS H. POWERS.

(*Extracted from Inaugural Thesis.*)

EXTEMPORANEOUS PHARMACY as practised in this city, consists not only of the preparation of what may be strictly called extemporaneous formulæ, but also of many of the officinal preparations of the United States and foreign pharmacopœias, which from their great number and liability to deteriorate by age, together with the small demand for many of them, renders it more advisable for the druggist to prepare them when wanted, than to keep a stock, which is frequently spoiling on his hands.

Under this head may be included the preparation of all

mixtures, emulsions, infusions and decoctions; many of the pills and powders, together with some of the cerates, ointments, liniments, medicated waters and tinctures, when they (i. e. tinctures) are merely solutions in alcohol, or proof spirit.

The officinal mixtures are few in number, and the directions given for their preparation are generally sufficiently full to enable the student of pharmacy to compound them without difficulty. When making the *ammoniac* or *assafætida* mixtures, clean tears or pieces should be selected; if this is not done, it will be necessary to strain the mixture; but when the pieces are quite pure and clean, this may generally be dispensed with, it only being necessary to pour the clear liquid off the undissolved part. If either of these mixtures are wanted in haste, warm water may be used for their preparation. They should be prepared in either a marble or composition mortar, of which one should be kept on purpose for *assafætida*. For making the *almond* mixture, a marble mortar answers best, (though not generally used;) and when preparing it, only part of the water ordered, should be used at first, the mixture then strained, and the residue thrown back into the mortar, and rubbed with the remainder of the water. All the pharmacopœias direct powdered myrrh to be used for the *compound iron mixture*; but fine pieces of crude myrrh rubbed up with a portion of the water makes a much better mixture; the powdered myrrh is so dry, that it is scarcely acted on, even by the water and carbonate of potassa; besides, it contains any impurities that may accompany the crude; by selecting fine pieces of the latter, we avoid both these disadvantages.

Kino is occasionally ordered either to be dissolved in water, or suspended in mucilage; if we attempt to rub it down with water, or gum and water, it forms a cake beneath the pestle, which is very difficult of solution; this difficulty may be obviated, to a great degree, by using boiling water. The same may be said of extracts when similarly directed, provided the heat of the water would not be injurious to the article.

Camphor, when ordered in mixture, should be first powdered with a small quantity of alcohol, (M.v. or vj. being sufficient for ℥j. of camphor,) then any other dry articles which may

be directed with it, rubbed thoroughly in, (the object being to divide the camphor as finely as possible) and lastly, the liquid with which the mixture is to be made up, gradually added, constantly stirring.

Spermaceti is frequently directed to be made into an emulsion with yolk of egg or mucilage, or both together, and it is important to have the spermaceti finely divided; for this purpose the French authors direct it to be powdered with a few drops of oil of sweet almonds, which answers the purpose of an intermediate very completely. The gum and sugar, if any is directed, may then be rubbed with it—next the yolk of egg, and lastly, the water gradually added.

The *oily emulsions* are often a source of difficulty to the student of pharmacy. Some authors direct the oil to be first shaken with the powdered gum arabic, the water then gradually added, constantly shaking; the whole to be done in a vial; others direct them to be mixed in the same manner, but in a mortar; when made in a vial, part of the mixture of gum and oil adheres to the bottom and sides of it, and have to be separated from them by mechanical means; if the mixture be made in a mortar, the water must be very carefully added in a continued small stream, and the whole very dexterously stirred, in order to ensure success, and even then, it will not have the same milky appearance as when made with mucilage, which is now generally preferred for this purpose. The quantity of powdered gum arabic ordered in the recipe, should be made into mucilage, with double its weight of water, and if there be any sugar directed, it is added, with about half its weight of water; the oil then gradually added and well stirred in, and afterwards the water in the same manner. *Volatile*, and *fixed oils*, and *copaiba*, may be mixed or made into an emulsion in this way, with the greatest ease. One cause of failure in making these emulsions with mucilage, arises from the latter being made too thick. When this is the case, the oil and mucilage seem to unite, and form a compound which is not acted on by the water.

Castor Oil is frequently directed to be made into an emulsion with the white of an egg; in this case the white should

be first well stirred or beat up, and if there be any sugar ordered it must be added; then the oil, but very gradually, constantly stirring, and lastly, the water in the same manner. If we add any water to the white of the egg before rubbing up the oil, it is almost impossible to make a mixture.

There are no mixtures with which we have more difficulty than those containing *magnesia*, combined with *resins*, *gum resins*, *tinctures*, *sulphate of magnesia* &c. They all have a greater or less tendency to become solid, depending on the manner of mixing, and the proportions of the articles. Gum resins should be first made into an emulsion, the tinctures diluted, and the *magnesia* perfectly mixed with some of the watery menstruum with which the mixture is to be made, before adding one to the other, and the more dilute both can be made, the better. Sulphate of *magnesia* is generally dissolved previously to being mixed with the *magnesia*, and such resins as are prescribed with it, are mostly, if not always in the form of tincture.

A mixture called *Dewees' Carminative*, which is much used in this city at present, is a source of difficulty to most druggists; it is composed of *magnesia* ℥ss., *sacchar.* ℥i., *tinct. asfoet. grs.* lx., *tinct. opii. grs.* xx., *aquæ. f.* ℥j., and when made with these articles, either by diluting the tinctures and then adding the *magnesia* and sugar, previously mixed with a portion of the water, by dropping them into the water, *magnesia* and sugar previously mixed, or by rubbing the tinctures with the *magnesia* and sugar, and gradually adding the water, the whole invariably becomes solid, or rather gelatinous, in the course of a few days; the best manner of making, perhaps, is to dissolve the sugar in one half of the water, and add this solution to the tinctures previously dropped into the vial intended for the mixture, then to rub down the *magnesia* with the remainder of the water, and lastly, mix together the two liquids thus prepared; mixed in this way, it will sometimes remain liquid, but cannot be relied upon, as a mixture of merely *magnesia*, sugar, and water, in the proportions for forming this compound, will frequently become gelatinous in the course of twenty-four hours. Of the two kinds of *magnesia*, kept in the shops of this city, viz. that prepared from

the American, and that from the English, or Scotch carbonate; the former seems to show rather the least disposition to solidify, although the latter is more smooth and free from sand.

Nitrous, nitric, and muriatic acids, are often prescribed with *spirit of nitrous ether*; and water and sugar is generally added to the compound; care should always be taken to mix these articles in such a manner that they will not react on each other, at least not violently; the acids should be diluted before adding the spirit of nitrous ether to them, and the sugar first dissolved and then added to the diluted acids; without these precautions, nitrous, or muriatic ether, will be formed when spirits of nitre is mixed with either of these acids, and oxalic, with nitrous, or nitric acids, and sugar. Sometimes with the former articles, when there is not sufficient water ordered to prevent their acting on each other, the quantity of ether formed and gas extricated, will be sufficient to break the vial in which the mixture is sent out, and this will happen generally after it is delivered to the customer, as the action does not take place until some minutes after mixing, and depends, too, on the proportions of the articles.

Mixtures of *lemon juice* saturated with *carbonate of potassa*, are frequently ordered by our physicians, and are often improperly prepared; some say that carbonate of potassa should be added until the mixture does not redden litmus paper; but this is not a very certain mode, as the carbonic acid, which remains in solution, will change the colour of litmus; the taste is perhaps the most certain test, but two scruples of subcarbonate of potassa will mostly saturate f. $\frac{3}{4}$ of lemon juice, although many physicians direct but half a drachm for the same quantity, and this last proportion makes the most pleasant mixture. When saturating lemon juice, it is always best to dissolve the carbonate of potassa in the water ordered, and then add the lemon juice, or else to first dilute the lemon juice, and then add the carbonate of potassa; this will generally prevent a flaky precipitate which is always formed when one is thrown into the other without either of them having been diluted.

As a general rule for making a mixture, when an insoluble

powder, or powders, are to be suspended in mucilage, we may say, first mix together the dry articles, and then add the aqueous menstruum with which the mixture is to be made; but sometimes it is necessary to reserve one of the dry articles, and add it to the mixture towards the last, as in the comp. iron mixture. When drops of any articles are directed, they should always be dropped either into the vial intended for the mixture, or into a clean graduated measure; the latter is much the most safe, particularly when many are ordered, as we then have a *tolerable* opportunity of judging of their correctness.

Tinctures, or alcoholic liquids of any kind, should be diluted before being added to mixtures, particularly if the latter contain gum, and part of the water ordered may be reserved for this purpose; emulsions are frequently spoiled with Spirit of Nitrous ether for want of this precaution.

When an acid is to be added to any of the salts of the vegetable alkalies, in order to dissolve them, the latter should be first mixed with a small quantity of the water, or syrup, which may be ordered, and the acid then added, and if any other dry articles are directed in the mixture, they should not be added until the solution of the vegetable alkali is completed.

2d. INFUSIONS AND DECOCTIONS.—We are, in this city, but seldom called upon to prepare these articles, and the directions given by the pharmacopœias are so full, and the purpose, and the operations themselves so simple, that there is but little to say.

It is always necessary to use some discretion about the kind of vessel in which we prepare infusions or decoctions; for common use, tin vessels are the most convenient; the water for infusions may of course be boiled in them, but the infusion should be made in an earthenware vessel free from lead; with decoctions it is different, as tin vessels will only answer for boiling those articles which do not act on either it or iron; all such as will do so, should be prepared in glass or earthenware, or the iron vessels lined or coated on the inside with porcelain, will answer still better. Whichever kind

is used for this purpose, should be provided with a lid, and kept covered during the operation, in order to prevent, as much as possible, the oxidation of the extractive matter.

When a certain quantity of an infusion, or decoction, is called for in a recipe, it is a common practice to take the quantity of ingredients, ordered for the same bulk of water, as that of either of these directed; this, however, is a mistake, as part of the water is always absorbed by the dry articles, and consequently the liquid obtained has to be made up to the proper quantity with water.

To render these two preparations clear in a short time is often an object with us. Infusions may be first strained through a fine sieve, then permitted to stand for a sufficient time to settle, (for which purpose ten minutes will often answer,) and then be poured off; but with decoctions this would be improper, as part of the active principle frequently precipitates, by cooling, in the form of powder; the most of these, therefore, we must be satisfied with straining through a fine sieve, while hot.

3. PILLS.—Most of the officinal pills are easily prepared, the formulæ having been well studied, and tolerably ample directions given for the purpose, but with the extemporaneous formulæ we receive, it is frequently otherwise, they often being badly combined, and still worse directions given for their preparation.

In the making up of pills generally, those articles which will require powdering should be first put into the mortar, and of these the most difficult, or such as will require the use of an intermediate in order to powder them, first; these are to be well rubbed together, and then such as are kept ready powdered, added; next, if volatile or other oils are directed, they must be rubbed in; and lastly, the articles with which the mass is to be made, such as soft extract or blue mass, if either of them are ordered, or else confection of roses, or mucilage &c. as may be most proper.

The following are the articles mostly used for this purpose, viz. water, syrup, mucilage, confection of roses, soap, liquor-

ice powder, crumb of bread, and occasionally, turpentine, alcohol, or tinctures.

1. *Water*.—Such as contain a sufficient quantity of aloes, rhubarb, watery extract, soap, or any substance that forms a plastic mass with it, may be made up with water; and it is generally the best article for the purpose, as it adds but little to their bulk, though sometimes it is objectionable on account of the pills becoming too hard by age; when adding it to rhubarb alone, sufficient should be put in to make a rather soft mass at first, otherwise it should be added carefully, particularly when the pills contain soap.

2. *Syrup*.—This is mostly used along with powdered gum arabic; but when the pills contain a considerable quantity of any extract, or gum resin, this is not necessary. It answers better than water when they contain a heavy powder, or rather always when the increase of bulk it occasions will not be objectionable. A mass made with it rolls out better, and the pills do not become so insoluble by age.

3. *Mucilage*.—This is used when the pills are composed of insoluble substances, but is mostly objectionable on account of their becoming too hard by keeping. This inconvenience may be remedied, in a great degree, by a small quantity of sugar, or what is still better, by using powdered gum and syrup instead of mucilage; the mucilage most used is that of gum arabic, but in some cases one of tragacanth, made strong, is preferable; pills containing oxide of bismuth, or sulphate of iron, may be made up with this last, better than with almost any thing else. Mucilage, though frequently directed in recipes, is seldom or ever kept in the shops of this city; when it is called for, the powdered gum and water are used; therefore when pills are to be made up with it, a sufficient quantity of the powder is mixed in with the dry articles, and then water enough added to make a mass; a very good substitute for the powders of gum arabic or tragacanth, is the compound tragacanth powder of the London Pharmacopœia, which contains both these articles, together with sugar and starch.

4. *Confection of roses*.—This makes a very good mass with dry powders, such as calomel, sulphate of quinia, &c., when

its bulk is not objectionable. Those who manufacture this article largely are *said* to add a small quantity of sulphuric acid, in order to heighten its colour when the roses alone do not make it bright enough, and it is necessary to guard against this, for although the quantity it contains might not be at all injurious to sulphate of quinine, or morphia, or perhaps to any of the salts of the vegetable alkalies, it would be to acetate of lead, which is frequently directed to be made up with it.

5. *Soap*.—This is mostly used with a small quantity of water, and answers very well for pills in which more of an essential oil, or oils, are directed than the dry articles will absorb; it also answers for balsams, resins, and camphor, but should not be used when the pills contain calomel, or the salts of the vegetable alkalies.

6. *Liquorice powder*.—This is used to give consistence to a pillular mass, when it is too soft, and also to absorb essential oils; but its principal use is to roll the pills in, and put with them after they are made, in order to prevent their adhering together.

7. *Crumb of bread*.—This is most used for pills of arsenic, corrosive sublimate, croton oil, and acetate of lead; the two first mentioned articles should be first dissolved, or at least rubbed in a mortar with a small quantity of water, and then a sufficient quantity of crumb of bread added to make a mass. Some physicians direct the corrosive sublimate to be dissolved in alcohol, and then crumb of bread added; but when this is done it is almost impossible to roll the mass, so that it becomes necessary to rub them together until the alcohol evaporates, and then add a few drops of water; acetate of lead may be first rubbed to a very fine powder, and then a sufficient quantity of crumb of bread added to make a mass; when it is used for croton oil it is generally necessary to add a small quantity of liquorice powder.

8. *Turpentine*s.—When pills contain resins, these answer the purpose better than almost any thing else; such as contain guaiacum, make up very well with Canada balsam; but neither this or any other of the turpentine should be used

without the consent of the physician, at least in no extemporaneous recipe.

9. *Alcohol*.—This is seldom added to pills; but occasionally when they contain resinous extracts which are not hard enough to powder, and consequently difficult to mix; the addition of it is of great service.

10. *Tinctures*.—These may be used in similar circumstances in place of alcohol, but seldom are, unless directed in the recipe.

4. **POWDERING AND POWDERS**.—Powdering for extemporaneous recipes is usually performed in a mortar; occasionally a small mill, or else a grater, is used; the former for seed or berries, and the latter for orange peel, nutmegs, &c. When powdering in a mortar, care should be taken not to have so much of the substance to be powdered in at a time as to clog the pestle; this is more particularly necessary with heavy metallic substances, which indeed cannot be reduced to powder unless the quantity is very small in comparison with the size of the mortar; of this we frequently have an example with red precipitate. A mixed powder, when it exceeds a few drachms in weight, should be sifted, if convenient to do so, and afterwards the whole well mixed together; this much improves the appearance of it. In order to pulverize some substances, it is necessary to use an intermediate; for instance, camphor or iodine require a few drops of alcohol; spermaceti, a fixed oil, (oil of almonds answers best,) and some of the resins powder best with sugar, though gum may be used if it is ordered with them and sugar is not; the intermediate should be inert or at all events not act in a contrary manner from the substance to be powdered. With some mixed powders a reaction will take place, and this will sometimes produce moisture, and at others, change of colour; the former will take place with a mixture of sulphate of zinc, and acetate of lead, which, well known as the circumstance is, are still occasionally ordered together in powder. The difficulty may be partially obviated by using crystals of both the articles, and either laying one upon the other, or else merely mixing them lightly with a spatula; change of colour

is produced by the action of chalk on calomel, the mixture assuming a dull gray tint; becoming darker by keeping; as these two substances are generally divided into doses, this may be partially prevented by dividing the chalk and calomel on separate papers, and merely laying them together without mixing in a mortar.

Small quantities of some articles are frequently directed to be mixed with a certain quantity of gum arabic, in order both to give a vehicle for administering them, and to apportion the dose with greater accuracy; the gum for this purpose should not be in too fine a powder, if it is, they are difficult to mix; that which has been powdered in a mortar answers much better than that which has been ground in a mill and sifted in the same manner that Peruvian bark generally is, as the particles of the former, roll, as it were, over each other, while the latter, being more like fine wheat flour, rubs into a sort of cake. When a large and small powder are to be mixed together, part of the large should be first put into the mortar with the small one, and well mixed, and the remainder afterwards added.

CERATES, OINTMENTS, AND PLASTERS.—Such as we prepare extemporaneously, are mostly composed of a dry powder, and either lard or some one of the officinal cerates &c. which are kept prepared. In order to make a good article in this way, it is necessary to pay great attention to the fineness of the powder added; this is also of importance in regard to their medical effect. They are generally prepared by rubbing together the articles on a marble or composition slab with a steel spatula; when citrine, or any ointment containing free acid, enters into the composition, a horn or wooden spatula should be used, and in these cases it is also necessary to avoid a marble slab, substituting one of earthenware or composition in place of it; the same articles may be used for preparing the ointments of iodine, or iodide of potassium, but a mortar is mostly preferred. When making the ointment of iodide of potassium, the addition of a few drops of water renders it much more smooth; the great solubility of this salt enables us to add sufficient water to en-

tirely dissolve it, without inconvenience, but at the same time it has the disadvantage of hastening the change of colour that takes place in this ointment.

It is worth remarking that the iodide of potassium changes the colour of simple ointment in a much greater degree than it does that of pure lard. The ointment made of the usual strength (viz. \mathfrak{Dj} to the \mathfrak{Zj}) with simple ointment, changes in the course of a few days to a yellowish brown, but if made with lard, only to a very light straw colour; nor does the colour of the latter approach any nearer that of the former by further keeping. From this it would appear that the principal effect is produced by the wax in the simple ointment.

We are occasionally called on for ointments or plasters of narcotic plants at seasons of the year when we are unable to prepare or obtain them prepared according to any officinal formula; on such occasions, if a good extract of the plant can be procured, we may make a very good article by rubbing a proper quantity of soft extract on a slab with either simple cerate or ointment, or else with adhesive plaster, previously softened by *heat*.

The mercurial ointment, by standing, separates into two parts, one of which is quite soft, while the other becomes so hard that we are unable to reduce the lumps it forms by means of a palette knife, at ordinary temperatures; it may, however, be rendered smooth by slightly warming it, and rubbing down the lumps while soft, taking care at the same time not to injure the ointment by the application of too great a heat.

LINIMENTS.—Those prepared extemporaneously, are made in the same manner as mixtures.

MEDICATED WATERS.—There are several of these occasionally called for, which, from the small demand for them, are not kept prepared in the shops; it is thus with the waters of pennyroyal, fennel, aniseed, and some others; any of these may be prepared in a short time, in the manner directed in the pharmacopœia for cinnamon water. But when medicated waters, prepared in this manner, are to be used for dissolving any of the salts of the vegetable alkalies, it is necessary to

add a small quantity of acid, in order to neutralize any magnesia that may be in solution.

TINCTURES.—The only tinctures we prepare extemporaneously, are those of iodine and kino; both of which are altered by standing, in a short time. It is necessary first to rub the iodine with a few drops of alcohol in order to powder it, and when this is completely done, we may add the remainder of the liquid. Most kino dissolves best in water, and in preparing the tincture the solution may be hastened, by first rubbing the kino with the water necessary for making the proper quantity of proof spirit, and afterwards adding the alcohol to the watery solution, while still on the undissolved part of the kino.

ART. XXII.—Pharmaceutical Notices.—No 8.

Citric Acid.—The tests generally indicated by chemical authorities for detecting the imposition which is occasionally practiced, in substituting tartaric for citric acid; are, the forms of the crystals and the exhibition of potassa and several of its salts. The former is often a bad criterion, inasmuch as the falsifiers take good care to pick out and mutilate the crystals of tartaric acid, so as to give them some resemblance to those of citric acid. The second method, although unexceptionable when properly practiced, requires, however, a certain management which I have not seen explicitly pointed out in any chemical work. The rationale of this test is founded upon the peculiar tendency of tartaric acid to form, with potassa or several of its salts, a double salt of potassa, (cream of tartar,) which is almost insoluble. This property is not possessed by citric acid, even added in great excess to the alkaline solution.

No more, as far as I know, has been said respecting this distinction; and it might be inferred by some, that any mixture of tartaric acid and potassa or some of its salts, will yield a precipitate of bi-tartrate of potassa. This, however, happens only when tartaric acid is added in excess; other-

wise, a simple tartrate is produced, which is exceedingly soluble. This test will generally succeed, whenever the alkaline solution is poured gradually into the acid solution; for under these circumstances, the potassa is at once over saturated. But should the inverse take place, no precipitation occurs, until an excess of acid be poured in. This may be illustrated by gradually dropping into an alkaline solution, coloured by litmus, a solution of tartaric acid, until the blue colour changes to a light pink. As there is as yet but the quantity of alkali requisite to form a simple tartrate, of course no precipitation takes place; but so soon as more acid is added, cream of tartar begins to precipitate.

These remarks were elicited by the following circumstances, well deserving the attention of the pharmacist:—Since the publication of Mr. J. Scattergood's remarks on the neutral mixture, prescriptions for that draught, compounded directly from the citrate of potassa, have, for the first time, probably, made their appearance in our pharmaceutical establishments. As I was destitute of this salt, I undertook to prepare some from a lot of pretended pure citric acid, received not long ago from a most respectable source; but on testing it, it was found to be nothing but tartaric acid. On five samples I procured afterwards from different stores, only two were citric acid;* the three others were the same imposition, and with none of the five samples did the exhibition of chloride of barium indicate the presence of sulphuric acid.

The samples of citric acid were generally in larger crystals, many of them in regular rhomboidal prisms, distinguishable at once from the longer hexædral prisms of tartaric acid. The samples of the latter were in fragments, among which many exhibited the hexædral form, and the angles had apparently been smoothed by the process of rotation. E. D.

Physick's Issue Ointment.—Dr. Physick, of this city, is in the habit of using a preparation for the purpose of keeping

* I think both samples came from the same source; one I obtained myself from the chemical manufactory of Messrs. Elliot, of this city.

issues open, which is known by the name of Dr. Physick's Issue Ointment. It is made by boiling half an ounce of powdered cantharides in two ounces of rose water, and evaporating till one half of the fluid is driven off, having previously added fifteen grains of tartar emetic. The decoction is to be strained, and three ounces of olive oil, one and a half ounces of white wax, and one ounce of spermaceti added to it, and the mixture then boiled till all the water is evaporated. This preparation, when properly made, forms a light coloured cerate, and in many cases is admirably suited for the purposes for which it is designed; but has the disadvantage of not possessing an uniformity of strength, owing in all probability to the difference of temperature at which it was made.

I cannot discover what benefit can arise from the addition of the tartar emetic, the quantity ordered is so small that it can scarcely exert much influence; added to which, from the manner in which it is mixed with the other ingredients, the salt is probably decomposed either wholly or in part.

E. Hopper.

Benzoin, and Benzoic Acid.—It is stated that the white tears, and the brown connecting medium of gum benzoin, contain about the same proportion of benzoic acid. From some experiments, I did not find this to be the case, having obtained but $8\frac{1}{2}$ per cent. of impure acid from the white tears, whilst the brown portion yielded me 13 per cent. It should, however, be observed that the brown portion on which I operated was of a clear transparent appearance, with a smooth clear fracture.

Benzoic acid may be extracted from tolu, and some other of the balsams, by simply boiling them in water, which dissolves the acid, and precipitates it on cooling. In this way I procured 9 per cent. from tolu; 5 from styrax, and $4\frac{1}{2}$ from balsam Peru. I found it impossible to sublime it from these balsams, free from oil, as this latter was volatilized at about the same temperature as the acid.

S. W. Brown.

ART. XXIII.—*On Daturia.* By SAMUEL SIMES.(Extracted from *Inaugural Thesis.*)

IN the winter of 1831, being induced to take up this subject, I repeated the process laid down by Mr. Brandes, with little or no success; I then tried the following, based upon his.

I obtained a strong alcoholic decoction of the seeds, added while hot, magnesia, filtered, and submitted the precipitate to the action of boiling alcohol f.* filtered, and removed the colouring matter by the agency of animal charcoal; evaporated and set aside, there was deposited considerable oil and resinous matter, together with white semitransparent crystals, which have an acrid taste, not perceptible at first, on account of their slight solubility. I repeated this process several times, with similar results. In the process of Brandes, the colouring matter probably prevented the regular crystallization. Not having contemplated writing on this plant, prior to the time for collecting the seeds, and not being able to obtain any on which reliance could be placed, my exertions for the present were suspended; but the succeeding fall, having collected a fresh supply, my efforts were resumed. I was left to my own discretion in relation to the quantities, strength, and other particulars necessary to be observed in the extraction of this alkaloid principle. After varying the processes in numerous ways: as, employing the seeds in their whole state, in a coarse, and in a fine powder; making the decoction strong and weak; with alcohol, alcohol f., and with water; adding the magnesia to the decoction while it was hot, and when it became cold; letting the action of the magnesia on the decoction be of long and short duration; submitting the precipitate to the action of boiling alcohol and boiling alcohol f.; evaporating the filtered solution, without treating it with animal charcoal, and treating it with it; and lastly, evaporating the filtered solution spontaneously—slowly—and expeditiously.

* When the term alcohol is employed, it will be understood that it is of the specific gravity 8.483 +, and when alcohol f. that the specific gravity is .818 + in relation to weights, troy has always been used.

After observing particularly the results of all these different modes of treating the seed, a few of which will be related, I have come to the conclusion that the following is the most approved. I took one pound of finely powdered stramonium seeds, boiled them for one hour in three pints of alcohol, filtered, and while hot, added ℥iv. of magnesia, set it aside for twenty-four hours, with occasional agitation, collected the precipitate, and boiled it for a few minutes in f. ℥xii. of alcohol f., filtered and treated the solution with animal charcoal; after filtering, a colourless transparent liquid was obtained; (I tasted a small quantity of it, which produced nausea and headache,) on evaporating this to one half, I set it by; the next day I found deposited on the bottom of the evaporating dish, innumerable small globules of oil, and the sides of the dish were covered with small white crystals; as the evaporation proceeded spontaneously, more crystals were successively deposited, leaving as a residue in the bottom of the dish, oil and resinous matter. *Rationale*.—The *daturia* (according to Brandes,) exists in the seeds in the state of a malate, the alcohol attracts it, and on adding magnesia to the decoction the malate is decomposed, the acid unites with the magnesia, and forms malate of magnesia, which remains in solution; the *daturia* which is set free precipitates along with the excess of magnesia; by treating this precipitate with boiling alcohol f. the magnesia is left, and the *daturia* is taken up, together with a portion of colouring matter, this being removed by the agency of animal charcoal, and the solution on cooling deposits the *daturia*, it being only slightly soluble in cold alcohol. By the assistance of a powerful magnifier, the crystals were found to be regular oblong quadrangular prisms, very like the crystals of Epsom salts.

Experiment No. 1. I boiled ℥viii. powdered stramonium seeds in one pint of alcohol, for one hour, filtered, and while hot added ℥ij. magnesia, let it stand for eighteen hours, filtered, and boiled the precipitate in f. ℥vi. of alcohol f., filtered and evaporated one-third, then set aside for deposition.

No. 2. I repeated No. 1, except that the magnesia was added to the decoction when it became cold. No. 3, I repeated No. 1,

with the addition of submitting the alcoholic f. solution to the action of animal charcoal. No. 4. I repeated No. 3, with the alteration of adding the magnesia to the decoction after it had become cold. In the deposition of Nos. 1 and 2, there was no perceptible difference, oil, resin, and a reddish granular substance, in small quantity, being the products. Nos. 3 and 4, crystals were precipitated, possessing all the properties of those formerly described; the deposition of Nos. 3 and 4 differing in themselves by more crystals being formed from No. 3. By comparison of the four preceding experiments and results, it appears the magnesia should be added to the decoctions while hot, this means resulting in the more complete decomposition of the salt than otherwise would have taken place, and the charcoal, in removing the colouring matter, conduces to the regular formation of the crystals.

I added to an aqueous decoction of the seeds, water of ammonia, of the specific gravity .960, which threw down a crystalline precipitate; on dissolving this in boiling alcohol f. and subjecting it to the action of animal charcoal, filtering, and evaporating, crystals were deposited, possessing all the properties of those obtained by the employment of alcohol; their quantity was comparatively small.

To ℥ij. of powdered stramonium seed, I added two pints of dilute sulphuric acid, and boiled for one hour, the menstruum extracted a large quantity of mucilage, which made it very difficult to filter; on adding to the filtered liquor f. ℥ij. of water of ammonia, a dark, almost black, coloured precipitate was thrown down; collected this precipitate, and boiled it in f. ℥vii. of alcohol f.; filtered, and treated the solution with animal charcoal, evaporated one-third; nothing satisfactory was produced upon standing. I repeated the preceding experiment, with the alteration of maceration for a week, instead of boiling for an hour; there was nothing satisfactory in the deposition. A serious objection arises from employing water as a menstruum, and more particularly when an acid is added, the water extracting the mucilaginous matter, and the acid and heat coagulating the albumen, render the decoction so thick that it is almost impossible to filter it.

The large quantity of fixed oil which the stramonium seed contain, was very annoying in all my experiments. To get rid of this, I flattered myself it could be removed by the menstruum, employed for the same purpose, in the extraction of the Emetia from the root of the *Cephælis ipecacuanha*.

I macerated ℥iv. powdered stramonium seed in f. ℥x. of sulphuric ether of the specific gravity .748, for a week, with occasional agitation; the ether, when filtered from the seeds, was of a pea green colour; on spontaneous evaporation, it left three different substances; first, 325 grains of a transparent light pea green coloured oil, which has a nauseous taste, and ethereal odour, of the specific gravity .9666+, insoluble in water and cold alcohol; soluble in boiling alcohol and ether; inflammable, burning with a white flame, and forming with the fixed alkalies, saponaceous compounds. This oil, upon standing, sometimes deposits a white pearly crystalline substance; secondly, 60 grains of a reddish yellow coloured fluid, of the specific gravity .99, soluble in hot and cold alcohol and ether, diffusing itself through water, causing a milky appearance; on spontaneous evaporation, it leaves oil, and a red resinous matter, exactly resembling that which is left after the evaporation of the mother water, from which daturia has been deposited; thirdly, crystals were also precipitated, but being mixed with such a large quantity of oil, I could not determine their properties. I treated the seeds, on which the ether had exhausted its solvent powers, by the mode for obtaining daturia, but not the slightest trace of it was to be seen; it may be inferred from this that daturia, in the state in which it exists in the seeds, is soluble in ether. I repeated these experiments with ether, with the same results.

Daturia is a white semitransparent crystallizable substance, the form of its crystals being an oblong quadrangular prism; its taste is slightly bitter and acrid. It is insoluble in cold water, cold alcohol, and ether; partially soluble in boiling water, and very soluble in boiling alcohol; the strong acids have little effect on it, with the exception of the sulphuric, which carbonizes it. Daturia unites with the acids, and forms soluble white crystallizable salts. The sulphate crystallizes

in needles; the muriate, in groups, each group consisting of a number of small linear crystals, radiating from a central point; their outer extremities terminating in such a manner as to form an irregular oblong square; the nitrate, in acicular crystals; the tartrate, was of a granular appearance.

The proximate constituents of stramonium seeds not (to my knowledge) having been mentioned by any writer, the following are offered as the results of experiment: a salt of an alkaloid principle, discovered by Mr. Brandes; fixed oil, insoluble in water and cold alcohol, soluble in boiling alcohol and ether; red resinous matter, soluble in alcohol and ether; green colouring matter, nearly insoluble in cold water, cold alcohol, and boiling fats, more soluble in ether, and very soluble in boiling water, and boiling alcohol; a yellow reddish colouring matter, soluble in water, alcohol and boiling fats; gum and albumen. It has not been decided with certainty to which of these principles, (or any others which may have been found existing in this plant,) stramonium owes its virtues. Dr. Bigelow considers the virtues of stramonium to reside in an extractive principle, soluble in water and alcohol, and precipitated from its infusion by muriate of tin and sulphate of iron. Mr. Brandes considers daturia to be the active principle; for, says he, I was always affected with headache and dyspnœa, after tasting its salts. To this I can add my testimony, as producing the first effect in a very violent degree. This principle has never been employed in medicine.

I gave four grains of the muriate of daturia, dissolved in boiling water, and mixed with milk, to a small cat: it produced nausea, with a desire to vomit, together with great restlessness and contractions of the muscles of the legs and neck. It was given to it at ten o'clock at night: the following morning life was extinct.

Promnitz, on analyzing the leaves, found them to contain gummy extractive, extractive, fœcula, albumen, resin, and various salts. His analysis of the whole plant agrees with that of the leaves, with the addition of a large quantity of lignine. According to Dr. Thompson, carbonate of ammonia is one of its proximate constituents.

I treated the green leaves by the same process as the seeds, for obtaining *daturia*, without resulting in any thing conclusive; a slightly greenish coloured matter, soluble in boiling alcohol and water, being deposited. The leaves when dry were submitted to the usual process for obtaining *daturia*; a crystalline precipitate was thrown down, but in so extremely small quantity, that I could not determine its properties.

The period for gathering the leaves, is from the middle of August to the first of September; this being the time, before a small insect preys upon them, and the frost injures them. They should be dried carefully, and kept in close vessels, from the action of the air and light, as the latter deprives them of a portion of their colour, and probably of some of their virtues, as it does many other similar leaves.

Professor Bigelow informs us, that when the leaves are intended to be given in substance, they should be powdered as soon as dry, and kept in close stopped bottles.

The dry leaves are quite an energetic errhine, the effects of which I experienced in a sensible degree, together with headache in powdering some.

One pound of the green fresh leaves weighed, when dry, two ounces and two hundred and sixty four grains.

The stramonium seeds should be gathered as soon as ripe, and prior to the fall rains and frosts, which exercise an injurious effect on them. One pound of the recently gathered semina, lose by drying $\frac{3}{4}$ and 270 grains.

From the results of administration and analysis, it may be laid down as unequivocal, that the seeds of stramonium contain the virtues, in a more concentrated and uniform degree, than any other part of the plant. All those practitioners who have employed the seeds, or any of its preparations, consider them to be much superior, as medicines on which they can depend, for uniformity of strength and operation.

Dr. Marcet considers the extract, as prepared from the seeds by Mr. Hudson, to be much more certain in its effects, so much so, that one part is equal in power to two of that prepared from the leaves. The seeds before and after collection, are not so liable to become injured. This also renders them pre-

ferable. Many other arguments might be brought forward to prove the superiority of the seeds over any other part of the plant, but it is not necessary. I think these are sufficiently conclusive, and my opinion is, that the revisors of our National Pharmacopœia would add much to the efficacy of its ointment and extract, by substituting the seeds in lieu of the leaves employed in those preparations.

I prepared some extract according to the recipe of Mr. Hudson;* one pound of the seeds produced nine drachms and two scruples, of a dull, black, crumbly extract, with a bitter, slightly sweetish, and extremely nauseous taste, and a peculiar herbaceous and strong narcotic odour.

The seeds and leaves are not unfrequently administered in substance. Dr. Archer considers the seeds the best form of administration, others prefer the leaves.

In domestic practice, the leaves moistened or steeped in vinegar, are of considerable repute, as a sedative application in local pains; and also the decoction in lotions and fomentations.

By American surgeons, poultices made from stramonium are preferred even to belladonna, to dilate the pupil before operating for cataract.

* For recipe see Coxe's Dispensatory, pages 287 and 288, of ninth edition.

ART. XXIV.—*On the Chlorides of Oxides.* By E. DURAND.*(In reply to Art. VII., Vol. V.)*

MR. COHEN, in his remarks upon the compilation which I published three years ago, in the first volume of this Journal, has pointed out but one error—"a misstatement of names;" This I was unaware of, until I saw his communication; for, as has already been mentioned in a former article, I had not referred to the paper from the time the manuscript was handed to the editor.

I had hoped that this candid acknowledgment would have satisfied Mr. Cohen; but it appears that this gentleman requires still greater concessions. But I cannot admit that those parts of my compilation which he has quoted as errors, are so, on his mere dictum. Let him produce experiments in support of his opinions, and facts invalidating the theories, universally received, and yet taught by the leading writers on chemistry; and I will cheerfully admit that I have been in error. But, whilst he is unsupported by such proofs, I must be permitted to adhere to the views which I have advocated. Hitherto, I am conscious that this controversy has been attended with no beneficial results, and shall therefore close it on my part, with a few observations on the reply of Mr. Cohen.

That gentleman endeavours to prove that the most concentrated solution of chloride of lime contains less chlorine than Labarraque's liquid; but he fails completely in his undertaking. First, I have made no allusion whatever to Faraday's amended solution of Labarraque, which solution, whatever Mr. Cohen may say to the contrary, is about one-half stronger than the original liquid. In the second place, the maximum concentration of a solution of chloride of lime, is not limited to one part of this salt to twelve of water; it may be made double, treble, and quadruple. Thirdly, Labarraque, as well as Faraday, washes his chlorine, by which process one-third of the gas is absorbed. If Mr. Cohen will again

make his calculations, he will find that Labarraque's solution contains only 1.84 per cent. of chlorine, equal to a solution of one part of chloride of lime in twelve of water; and that of Faraday 3.16. Hence, as my intention was merely to prove that a solution of common bleaching salt, which may be obtained for a trifle, would at least be equal to the expensive preparation of Labarraque; I think that I have carried this point. The experience that has been acquired during the prevalence of the cholera, has perfectly justified my assertions.

In mentioning the identity of Labarraque's and Payen's solutions, I could not imagine that Mr. Cohen would take it in the broad acceptation of the term. Indeed, he well knew that I am not so ignorant of the laws of chemistry, as to admit their strict identity of composition. The identity which is established by almost all the writers upon chemistry, and for which I am still contending, is that relating to the quantity of chlorine in either solution; to their action as disinfectors, and bleaching agents, to permanency &c. In these solutions, whether chlorine is combined with the carbonate of soda, or whether this salt is transformed into a chloride and a bicarbonate of that base, or whether (this opinion is now prevailing) a new salt, *chlorite of soda*, is produced, are still very doubtful. But whatever the combination may be, it is incontrovertibly true, that the presence of carbonate of soda in the liquid prevents the decomposition which might otherwise take place, after a certain length of time. Mr. Cohen, instead of ascertaining this fact by actual experiment, prefers denying it at once, and adduces with emphasis, and for the second time, this pompous sentence, "Payen has his chlorine combined with caustic soda, which, *in consequence of changes well known to chemists*, becomes a carbonate [he means a chlorate] of soda, and a chloride of sodium." Chemists say no such thing with respect to Payen's chloride. Besides, a chlorate is not generally formed by transmitting chlorine through an alkaline solution, unless this solution be highly concentrated, (about 32° of Baumé's areometer for salts,) or the chlorine be added in great excess. After a lapse of time, or when heat is applied to a pure chloridic solution, there may

be a formation of a chlorate; but with the impure solutions of Labarraque and Payen, or with other similar ones containing an excess of carbonate of the same base, and not highly saturated, this reaction does not take place. In other respects, the smell and taste of these impure solutions of soda, are very similar; when heated, both evolve but little chlorine; the dry mass afforded by evaporation, when redissolved, retains the odour, taste, and even bleaching power of the liquid which yielded it, and the ultimate results have the greatest analogy to each other.

If Mr. Cohen has not taken the trouble of ascertaining the truth of his assertions, it has not been the same on my part in establishing their fallacy. Among other experiments, I have tried the comparative strength of two different chloridic solutions, one prepared by Mr. Cohen himself according to Labarraque's process, and obtained on the 22d of November last at the store of Mr. S. P. Griffitts, jr. The other was from my own manufactory, made by Payen's process, in June last. Both bottles were in pretty good condition. The first experiments were made on the 23d of November, in presence of my two assistants, with Welters and Marozean's chlorometer; the others have been made to-day, (10th of May,) with the remainder of the same liquids, by the method recommended by Henry and Plisson. I have not found that Payen's liquid after the lapse of nearly one year, has undergone the prompt decomposition that it ought to do, according to the assertion of Mr. Cohen, *in consequence of changes well known to chemists*. I can say on the contrary, that all the advantages were on the side of the latter liquid. From this unexpected circumstance I will not draw the conclusion that Payen's chloride is preferable to Labarraque's; but only that I have, by chance, obtained a solution which had not been combined with the full proportion of chlorine with which it was intended to be united. This fact is of sufficient interest to fix the attention of the authors of our Pharmacopœia, and induce them to repeat my experiments, with a view, if they are found correct, to recommend the best formula; as equality

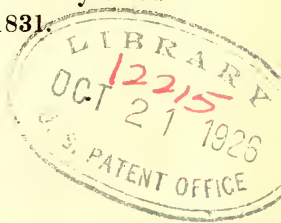
of products, with improvement in the process, give it a decided advantage.

Such are the evidences of that identity which I advocate, and it is admitted by Berzelius, Dumas, Turner, and the able authors of the New American Dispensatory.

In the sixth paragraph of his reply, Mr. Cohen at last admits the theory of Gaultier de Claubry, with this restriction, however, that carbonic acid is not the sole atmospheric agent capable of decomposing a chloridic solution, and that to the "*ammonia, its elements and compounds*," which always exist in a vitiated atmosphere, must be ascribed the complete decomposition of these substances. I must be permitted to doubt the accuracy of these assertions, and were it not my decided intention to give up this controversy, unless supported on the part of my adversary by actual experiments, I would ask Mr. Cohen whether he, or other chemists, have ascertained analytically, that such reaction takes place. I rather think, (and this theory is generally admitted) that ammonia, one of its elements, *hydrogen*, several of the compounds of this latter gas, and a few of those of ammonia, are acted upon by free chlorine as it is disengaged from the solutions of the chlorides of oxides by another agency. As to the action Mr. Cohen pretends that nitrogen, the other element of ammonia, has upon a chloridic solution, this is truly a discovery for which chemists will be highly indebted to Mr. Cohen, if he has the good fortune of supporting it by some few facts. Besides, ammonia and its compounds do not always exist in a vitiated atmosphere.

Finally, in recommending the employment of sulphate of indigo, in testing the strength of an impure chloride, I acknowledged its defects; but I was of opinion that with these imperfections, it was better calculated for these species of solutions than Morins and Marozeau's chlorometers. As Mr. Cohen, in his first paper, mentioned only the authority of this latter gentleman, I think he was not then better acquainted than myself with Henry and Plisson's chlorometer, otherwise he would have quoted the improved method of these last chemists. Their chlorom-

eter is undoubtedly preferable to former ones; it is founded upon the property that chlorine in its free state, or combined with an oxide, possesses of reacting, with the assistance of heat, upon ammonia, or several of its salts, in such a way as to evolve a volume of nitrogen corresponding to the proportion of chlorine contained in a chloridic solution; by means of which, this proportion may easily be ascertained by calculation. See *Journal de Pharmacie*, October, 1831.



SELECTED ARTICLES.

ART. XXV.—*Observations on the Apocynum Cannabinum.*

By JOHN H. GRISCOM, M. D. New York.

(EXTRACT.)

Botanical History.—The term *Apocynum* is derived from the Greek *Αποκυνον*, (Diosc.) *ἀπὸ*, and *κυνὸς*, because it was supposed to kill dogs. The Egyptians call this plant *ossar*, whence comes the name of the fruit *bidessar*, q. d. *Bordes ossar*, which in Arabic signifies the egg *ossar*, the pods of the great Assyrian sort being shaped like an egg.*

Of the Genus *Apocynum*, there are reckoned by botanists seventeen species,† of which the *cannabinum* is the second in order. It belongs to the *Fifth* class, *PENTANDRIA*, order *second*, *DYGYNIA* of LINNÆUS, and to the Natural order, *Contortæ Apocynæ* of JUSSIEU.

Synonyms.—Indian hemp—Dog's bane. It is most commonly known in this country by the name of Indian hemp.

GEN. CHAR.—*Calyx*. *Perianth* one-leafed; five parted, acute, short, permanent.—*Corolla*. Monopetalous, bell-shaped, semiquinquifid, divisions revolute. *Nectary*, of five glandular, oval corpuscles, surrounding the germ. *Stamina*. *Filaments* very short. *Anthers* oblong, erect, acute, bifid at the base, converging.—*Pistils*, *Germ*s two, ovate. *Styles* short. *Stigma*, roundish, bifid at the tip, muricate, glued to the anthers.—*Pericarp*. *Follicles* two, long, acuminate, one-valved, one-celled.—*Seeds*. Numerous, very small, crowned with a long down. *Receptacle*, subulate, very long, rough, free.

SP. CHAR.—*Corolla*. Bell-shaped. *Nectaries*, five, alternate with the stamens. *Stem* straightish, herbaceous, leaves oblong, cymes lateral, longer than the leaf.

* Miller's "Gardeners Dictionary."

† We have only *three* species of *Apocynum*, according to Nuttall and Eaton.

The foregoing characters, taken from MILLER, do not appear to coincide entirely with those given by other botanists. There seems to have been some doubt among them as to which plant the name *cannabinum* should strictly be attached, and by the quotations from the authorities made below, it is sufficiently proved that there are several *varieties* of this *species*, and the *A. pubescens** described by R. BROWN, appears to be one of these varieties; its character is therefore subjoined to the others. There is not, however, any probability that there is much, (if any,) difference in their medicinal virtues, therefore as no description yet given will apply to all the *varieties*, and as any plant which will agree with any of these descriptions, may be safely taken for *Apocynum cannabinum*, practitioners in different parts of the United States, or elsewhere, who may wish to use this medicine, may be saved from inconvenience and expense.

APOCYNUM.—*Calyx* very small, 5-cleft. *Corolla* campanulate; border with 5 short, spreading, or revolute lobes. *Anthers* sagittate, connivent, cohering to the stigma by the middle. *Glandular teeth* 5, acute, alternating with the stamens, and opposite the segments of the corolla. *Styles* obsolete. *Stigma* dilated, and conical at the apex. *Follicles* 2, long, linear. *Seeds* comose.†

A. cannabinum. Leaves lanceolate, acute at each end, glabrous; cymes paniculate; calyx as long as the tube of the corolla. OBSERVATION. Stem herbaceous, 2 or 3 feet high. Cymes lateral, longer than the leaf. Flowers greenish-white.

A. pubescens. Leaves ovate-oblong, mucronate, obtuse at the base—on both sides, and with the shorter cyme, pubescent; calyx nearly as long as the corolla. OBSERVATION. Stem

* Professor Eaton says, "Brown seems to have forced in an additional species, not found in nature."

† The generic character here copied, is taken from Torrey's Flora, "which being one of the *latest* publications, is more likely to be correct. The discoveries of new species, and the establishment of new genera, nearly allied to *Apocynum*, may from time to time, cause slight alterations in its character, according as new species are added, or old species are separated into other genera."—(Letter from his highly esteemed friend, D. Thomas, to the author.)

herbaceous, 2 or 3 feet high. Leaves almost tomentose on the under surface. Cymes terminal. Flowers greenish.

Elliott's Sketches.

A. cannabinum. Leaves oblong-oval, with hoary pubescence underneath; panicle pubescent; the limb of the corolla erect. OBSERVATION. Leaves and flowers greenish white, or yellowish-green.—*Barton's Compendium Floræ Philadelphicæ.*

A. cannabinum. Leaves oblong-oval, acute at each end; cymes paniculate; limb of the corolla erect. OBSERVATION. There is some variety in the leaves of my specimens; some being oblong-oval, and others lanceolate and tapering at base; or possibly I may have blended the two species *A. cannabinum*, and *A. pubescens*.—But if they are really distinct, they closely resemble each other in habit.—The *pubescence* is but slight in any of those which I possess.—*Darlington's Florula Cestricea.*

A. cannabinum. Stem upright, herbaceous. Leaves oblong, tomentose beneath; cymes lateral, longer than the leaves.—*Loudon's Encyclopedia of Plants.*

A. cannabinum. Leaves lanceolate, acute at each end, smooth on both sides; cymes paniculate; calyx as long as the tube of the corolla. OBSERVATION. Stem erect, slender, branched, purple, a little glaucous. Leaves 2 or 3 inches long, and three-fourths of an inch broad, on short petioles, attenuate at the base, very smooth. Cymes many flowered, paniculate, smooth, segments of the calyx, subulate, about as long as the tube of the corolla. Corolla small, campanulate, green; border erect. Follicles long, very slender.

A. pubescens. Stem erect; leaves ovate, hoary pubescent beneath; cymes pubescent; corolla longer than the calyx; border erect. OBSERVATION. Stem 2 to 3 feet high, with a few erect branches. Leaves on short villous petioles, obtuse, but not cordate at the base, mucronate, more or less pubescent beneath. Cymes short. Flowers few, (small.) Segments of the calyx lanceolate. Corolla greenish-white.—*Torrey's Flora.*

A. cannabinum. Stem erect and branching; leaves oblong-oval, hoary beneath, and downy when young, (more or less

glabrous in maturity;) cymes lateral and terminal; pubescent when young, (more or less glabrous in maturity;) tube of the corolla about equal to the calyx, with an erect limb.—*Eaton's Manual*.

Apocynum cannabinum is easily distinguished from *A. androsæmifolium* by the much larger flower of the latter; and from *A. hypericifolium* by the somewhat procumbent stem of the last, and by its having “very much the aspect of hypericum.”—Vide *Barton's Compend. Flor. Philadel.*

Description.—The roots of this plant are perennial, and creeping, the stems are brown, and about two feet high, the leaves smooth, in pairs; it abounds in a milky juice. Towards the upper part of the stem the flowers come out from the wings of the leaves in small bunches; they are of an herbaceous white colour, and being small, make no great appearance. This therefore is seldom admitted into gardens except for the sake of variety.* It flowers from July to September, and is a native of Virginia and Canada. It is propagated by parting the roots in March, before they put out new stems. It is hardy enough to thrive in the open ground, but the soil should be light and dry, otherwise the roots are apt to rot in winter. This sort spreads so much by its creeping roots as to be troublesome in gardens. The stems decay to the root in autumn, seldom ripening their seeds.† The bark of the stem when dry is very fibrous, and may be peeled off in strings, which are very tough and strong. The Indians of North America prepare the stalks of this species as we do hemp, and make twine, bags, fishing nets, and lines, and linen for their own wear.‡ It was cultivated by the Dutchess of Beaufort in 1699. One species of this plant, the *A. juvenas*, renovating dog's bane, is esteemed by the Chinese for possessing similar properties to those of the ginseng.§

The root of the species under consideration, which is the only part of the plant employed in medicine, belongs to the class *Radix repens*, and is frequently very tortuous. It con-

* The *androsæmifolium*, whose flower is larger, and of a purple colour, is more cultivated for appearance.

† Miller's Gard. Dict. London, 1798.

‡ Vide Kalm.

§ Rees' Cyclop.

sists of two distinct portions, the main body of the root covered with a bark. The ligneous portion is of a yellowish-white colour, possessing considerable bitter taste, and some odour. The cortical part is of a brown colour, and rough externally, white, and smooth within. Its taste is extremely bitter, rather nauseous, and somewhat similar to that of the *Sanguinaria canadensis*. Odour strong, and unpleasant.

The chemical investigation of this root has been pretty fully entered into, in order to ascertain its proximate principles. With this view numerous experiments were instituted, more than it would be advisable to embody here. In some instances the results obtained by the use of reagents, were somewhat doubtful as to their nature; in such cases I have drawn the most correct conclusions I was able, considering the limited state of our knowledge in this department of chemistry.

Experiment 1st.—Two hundred grains of the dried root were boiled one hour, in eight ounces of water till reduced to six and a half ounces. The decoction was of a bright brownish-red colour, having a strong and somewhat nauseous odour, and a very bitter taste, resembling very much those of the dry root. The addition of a few drops of a solution of sul. ferri. to a portion of it, changed its colour to a dark green. The primitive colour was restored by sulph. acid. A portion of the decoction was treated with the acet. plumb. in solution, which caused the immediate precipitation of a light brown, flocculent matter, in considerable quantity, leaving the supernatant liquor perfectly clear and transparent.

Experiment 2d.—One drachm of the fresh dried root was subjected to the action of three ounces of alcohol, also one drachm to three ounces of water. The tincture was of a very light brown colour, and possessed very little bitterness. The infusion was much darker and much more bitter.

Experiment 3d.—The addition of water to the tincture rendered it of a turbid, opaque whiteness, destroying its original colour. Sol. sulph. ferri. caused a light green colour. When added to the infusion it became of a turbid green colour.

Experiment 4th.—Forty grains of the ligneous part of the

root were macerated in two ounces of water for forty-two hours; the infusion was slightly tinged with yellow, apparently containing a good deal of mucilage. An equal quantity of the cortical part of the root was treated with the same quantity of water for the same length of time. This was of a bright brownish-red colour, similar to Madeira wine. On the *first* sulph. ferri. had but a partial effect, causing a very slight tinge of green. Acet. plumb. had only a slight effect; it threw down a little precipitate. On the *second*, sulph. ferri. had a decided effect, causing a dark green precipitate as in the former experiments. Acet. plumb. precipitated the same dark brown substance before noticed, in considerable quantity, leaving the liquor clear and transparent. From the latter, a white caseous precipitate was separated by the aqueous solution of gallic acid. A solution of carb. pot. had no effect on either infusion. The precipitate of the second from the sulph. iron. being filtered off, the remaining liquor was changed to a beautiful violet colour by the gallic acid.

Experiment 5th.—Eighty grains of the dried root were macerated in two ounces of water forty-eight hours, and the infusion evaporated to dryness. The residue was of a fine brown colour, and of a tenacious consistence.

Experiment 6th.—Two hundred grains of the dried root were put into \bar{z} xij. of distilled water; immediately after the immersion, the transparency of the fluid was lost, and it assumed a dull cloudy appearance, probably owing to the abundance of mucilage contained in the plant. At the end of twenty-four hours the liquor was of a clear amber colour, transparent. Neither the tinct. gallæ, tinct. iodine, oxal. ammon. or mur. barytes, had any effect on it. Eight ounces of the fluid were evaporated at steam heat. The residue was of a reddish-brown colour, thick in consistence, gummy. It could not be dried at this heat. Its taste was bitter, though differing somewhat from the solution before evaporation.

Experiment 7th.—The residual matter of the preceding experiment, was treated with distilled water; all the brown part was immediately dissolved, but a white scaly substance in

considerable quantity remained undissolved. This was soluble in alcohol.

Experiment 8th.—The root remaining from the sixth experiment was then treated with alcohol. The addition of water to a portion of it caused a precipitate in the form of a white cloud. The rest of the tincture was evaporated, and a white substance was left which was insoluble in water.

Experiment 9th.—Twelve ounces of boiling water were poured upon two hundred grains of the sliced root. The water immediately became cloudy, soon assumed a yellowish tint, and at the end of twenty-four hours was of a clear amber colour. At this time, at the bottom of the liquid, resting on the root, was observed a layer of a substance of a white woolly appearance, doubtless the mucilage of the plant, which was dissolved by the hot water, and precipitated when cold. Sulph. ferri. produced a slight green tinge, and acet. plumb. its before mentioned precipitate.

Experiment 10th.—When the aqueous infusion was treated with a solution of nitrate of mercury, a dirty white precipitate was formed, leaving the liquor above limpid, which in twenty-four hours, had assumed a purple colour. A solution of chlorine being added, this colour was destroyed, and a white precipitate thrown down. Lime water added to a part of this caused a yellow colour, which immediately changed to black. When the precipitate was washed with water, before adding the lime water, no yellowness was produced.

Experiment 11th.—One hundred and fifty grains of the dried root were macerated in successive portions of alcohol, until all the matter soluble in this menstruum without heat was taken up. The remainder of the root was then dried, and was found to have lost from forty to fifty grains, equal to about twenty-nine per cent. The alcoholic solution was of a bright yellow colour, possessing much bitterness.

Experiment 12th.—This was distilled in a glass alembic until two-thirds had gone over. The remaining fluid was then of a rather deeper yellow, intensely bitter, and containing a yellow, powdery looking substance in small quantity. This concentrated tincture was then placed over steam in a

glass vessel, and evaporated nearly to dryness. Soon after the evaporation had commenced, there began to form a thick viscid substance of a yellowish-brown colour, and a bitter taste, sufficiently acrid to blister the tongue in a few seconds. This substance appeared in considerable quantity. There was also observed a greasy looking substance, floating on the fluid, not so abundant as the preceding, but evidently differing from it.

Experiment 13th.—Five hundred grains of the root were covered with alcohol and allowed to macerate; which operation was repeated four successive times. The last time very little colour or taste was perceptible in the tincture. The united tinctures were distilled until about two-thirds had passed over, (a small portion being retained, which was changed to a milky whiteness when diluted with water, depositing in a few hours a white powdery precipitate.)

Experiment 14th.—The residuum in the alembic was placed over a steam bath, and about one-third evaporated, and then cooled. The edge of the fluid at the dish was covered with a *white, greasy looking substance*, very much resembling *tallow*, which extended in a thin coating up the sides of the glass. The bottom of the dish was also copiously dotted with a substance of apparently similar nature, but formed indistinct and separate globules, about the size of a large pin's head. They were entirely loose upon the glass, and a few of them uniting, *floated* on the liquor. The fluid was drawn off into another vessel, and this adipose substance left over the bath to dry, but as the globules soon began to assume a yellow colour from the heat, they were removed and allowed to dry spontaneously.

Experiment 15th.—The tincture was further evaporated, and when about one-half of it had disappeared, and the rest cooled, a considerable number of the brown, greasy looking globules, before mentioned, (Expt. 12th,) were observed floating on, and dispersed through the fluid.

Experiment 16th.—The white substance, upon examination, presented the following characteristics. It had no odour, but possessed the peculiar nauseous, bitter taste of the plant in a

very strong degree, and had an unctuous feel in the mouth, as well as between the fingers. It was insoluble in sulphuric acid, either dilute or concentrated, hot or cold, though blackened by it when concentrated. Acetic acid did not dissolve it. Potash water, nor aq. ammon. had any effect on it. Ether dissolved it readily; alcohol slowly, but completely. It was insoluble in water.

Experiment 17th.—The yellow or brownish, and greasy looking substance, which always appeared after the other in evaporating a tincture of the root, appeared to contain all the colouring matter capable of being extracted by the alcohol. This was so bitter, that when a piece not larger than a pin's head was held a short time in the mouth, it blistered the tongue severely, and the bitter taste remained several hours, affecting the tongue and fauces very disagreeably. It dissolves completely in alcohol, though slowly, and communicates to it a beautiful amber tint. It is insoluble in water, but after remaining in it a few hours, it loses its characteristic colour, and becomes of a dirty white; it is also rendered very pulverulent, where, as before, it was very adhesive.

Experiment 18th.—Two ounces of the root were boiled in twenty ounces of distilled water one hour, then allowed to cool, decanted, and a fresh portion added, and boiled half an hour; this was decanted and more water added. This operation was repeated until the water remained tasteless and colourless. The different decoctions being added together, were filtered; the colour was like that of Madeira wine. When tested with a solution of sulph. ferri. no change was produced until the fluid was concentrated, when it assumed a black colour, and threw down a slight precipitate. The tincture of iodine produced a dark purple hue, showing the presence of *fecula*. A solution of nitrate of silver caused a yellowish precipitate, showing the presence of *gum*, or *bitter principle*. Solution of acetate of lead produced a yellowish white precipitate. The decoction affects litmus paper, showing the presence of an uncombined acid. A solution of gelatine proved the presence of *tannin*. The decoction was evaporated nearly to dryness, and treated with alcohol, which separated

a portion of gum. This tincture was filtered, and evaporated nearly to dryness. The result was a dark reddish mass, which tasted at first sweet, but soon became intensely bitter, producing a swollen sensation of the lips and tongue.

Experiment 19th.—One ounce of the sliced root was boiled in ten ounces of alcohol fifteen minutes, and then macerated ten days. The alcohol when filtered, had the appearance of Madeira wine, and was very bitter. About one third was evaporated, and on cooling, a substance like wax was deposited, which was removed, and two ounces of distilled water added, which separated a quantity of *resin*. This was removed, and the evaporation was continued until it had the consistence of thick syrup. The taste of this was at first sweetish, soon becoming very bitter, and occasioning a swollen sensation of the lips and tongue.

Experiment 20th.—The root after being treated with alcohol, was dried, boiled half an hour in twelve ounces of distilled water, and then allowed to macerate three days. The water was then decanted, a fresh portion added, and boiled three quarters of an hour, when it presented a greasy appearance, which on cooling was found to be caused by wax. It was then filtered, evaporated to the consistence of a thick syrup, treated with alcohol, which separated a quantity of gum, again filtered and evaporated nearly to dryness. The result was the same as in experiment 19th, but in a lesser degree.

Experiment 21st.—The root, after being treated with successive portions of alcohol and water, until the bitterness was dissolved, was macerated one week in six ounces of ether. It was then filtered and four ounces distilled off, when the remainder became turbid; this on cooling deposited a copious, yellowish-white precipitate, which had the appearance and feel of wax. This, when heated, melts, swells, takes fire, and burns with a white flame, leaving a very small portion of charcoal. The remainder of the ether was distilled, and left a very small quantity of resin, which was not bitter.

Experiment 22d.—Two ounces of the sliced root were macerated in repeated portions of distilled water until it came off colourless and insipid. The several portions were united, fil-

tered and evaporated nearly to dryness, the extract being dark coloured, very bitter, and viscid, weighing two hundred grains. This was macerated in successive portions of alcohol as long as it dissolved any of it. The residue was a spongy mass, insipid, possessing all the properties of gum. The alcohol was then boiled with eighty grains of calcined magnesia, filtered and evaporated to dryness. The result was a dark, reddish brown mass, brittle, very bitter, nauseous and deliquescent. This may be considered as the pure *bitter principle*, coloured, as it is affected only by sub. acet. plumb. and nit. argent. which require twelve hours to show any change.

Observations.—The *first* experiment shows the action of two of the most active reagents which were employed.

By the *second* we have very clearly proved the superior power of water over alcohol in extracting the colouring and bitter materials of the root.

The object of the *fourth* experiment was to ascertain which part of the root contained the greatest quantity of active matter. The *cortical* part, it will be observed, contains by far the larger quantity.

It is shown by the *fifth* that much of its virtues is imparted even to cold water.

Experiments *third*, *seventh*, and *eighth*, prove the existence of a resinous substance, and that a considerable quantity of matter which cold water does not dissolve, is soluble in alcohol.

From these experiments we may finally conclude that this root consists of—1, tannin; 2, an acid, probably the gallic; 3, gum; 4, resin; 5, wax; 6, fecula; 7, bitter principle, or *apocynin*; 8, colouring matter; 9, woody fibre; and though I have not been able to prove its existence satisfactorily in the dry root, in the laboratory, I very strongly suspect that the fresh root and the juices of the plant contain a considerable quantity of—10, caoutchouc.

Medical properties.—The Indian hemp when taken internally appears to have four different and distinct operations upon the system:—1st. As an emetic. 2d. As a purgative.

3d. As a sudorific. 4th. As a diuretic.* Each of these effects it produces almost invariably. Its first operation when taken into the stomach is that of producing nausea, if given in sufficient quantity, (which need not be large,) and if this is increased, vomiting will be the result. It very soon evinces its action upon the peristaltic motions of the *prima viæ*, by producing copious feculent and watery discharges, particularly the latter, which action, when once excited, is very easily continued by the occasional administration of a wine glass full of the decoction. The next operation of this remedy is upon the skin, where it displays its sudorific properties often in a very remarkable manner. Copious perspiration almost invariably follows its exhibition, to which effect is, in a great measure, attributed by some, the powerful influence it exercises over the various forms of dropsy. The activity of its diuretic properties does not appear to be so great in many instances as in others. In the first three or four cases related, the urinary secretion, although somewhat increased in quantity, was not such as to be commensurate with the effect produced upon the disease by the exhibition of the medicine. In other instances its diuretic operation has been more manifest, causing very profuse discharges of urine, and in a very short time relieving the overloaded tissues of their burden.—*American Jour. Med. Sciences, May, 1836.*

ART. XXVI.—*A Dissertation on some Ancient Plants of Egypt.* By M. BONASTRE.

EVERY thing which tends to recall to our recollection the sciences or the arts of ancient Egypt, is sure to excite at the present day, in the minds of the most enlightened men, the highest esteem for its former inhabitants.

Since the important labours of Dr. YOUNG, upon hieroglyphics, and the learned discovery of M. CHAMPOLLION the

* As a *sternutatory* also, it has a very powerful effect, as I have experienced in my own case; the fumes, on one occasion, produced, not only long continued and violent sneezing, with an increased discharge from the Schneiderian membrane, but were unquestionable the exciting cause of an attack of erysipelas of the face and head.

younger, upon the interpretation of the hieroglyphic system of ancient Egypt, the history of that country daily acquires a higher degree of interest. There exists, nevertheless, a branch of natural science highly essential, upon which we have but a very imperfect idea, and that part is the botany of ancient Egypt. The Medico-Botanical Society of London having honoured me with the title of corresponding member, I have thought it my duty, as an expression of my gratitude, to transmit a succinct memoir upon some vegetables found in the interior of the coffins of Egyptian mummies of the highest antiquity. I accompany this memoir with some drawings which have been taken from nature; I also send some ancient fruit.

The first is the fruit of the *Mimusops*, from *μημους*, and *οφις*, *monkey face*: Octandria Monogynia: family Saponaceæ of JUSSIEU.

This fruit is often met with in Egyptian tombs, conjointly with the fig Sycamore, enclosed in a little basket variously coloured. The *Mimusops Elengi* is a proof of the great vicissitudes to which Egypt has been exposed; for this vegetable has entirely disappeared from the soil. No botanical work yet published upon that celebrated country makes mention of the *Mimusops Elengi*; and I have in vain consulted the Flora of Palestine, by HASELQUIST, that of Egypt by PROSPER ALPINUS, or that of Arabia by FORSKALL, or the illustration of the Flora of Egypt by DELILLE; none of these works indicate that the *Elengi* now actually exists in Egypt. The *Mimusops* is only found in the island of Amboyna, and some of the isles of the Indian Ocean. Its flowers exhale a most agreeable odour, which gives much pleasure to the females of the country, who perfume their apartments with it.

No. 2. *The Fruit Diospyros Lotus. Polygamia Diœcia; Plaqueminier; the Lotus.*

The fruit of the *Diospyros* does not form part of the Egyptian collection in the museum of the Louvre. It has been recently discovered by M. PASSA-LACQUA, and now constitutes a part of the Berlin museum. M. KUNTH, a distin-

guished botanist, has decided that this fruit belongs to the genus *Diospyros*, a species of lotus, which I believe, modern botanists refer to the genus *Celtis* of THEOPHRASTUS.

No. 3. *Myrobalan d'Egypte*, of RAUWOLF; *Balanites Egyptiaca*, DELILLE, Fl. Egypte; *Xymenia Egyptiaca*, DESFONTAINES; *El Eglyg*, of the Arabs of Fazoql; *El Ka*, of the Heathens. *Decandria Monog. Terebintaceæ*.

This ancient fruit was discovered in a little votive basket, which had served to contain offerings to the gods of Egypt, and it is frequently found in the coffins of mummies. This *Myrobalan* is furnished with a sort of spongy bark, more or less thick; the pellicle which covers it in its state of antiquity is of a red colour, sometimes shadowed with violet.

The stone is marked longitudinally, the sides forming five to six rather saliant angles; the shell is rather thick; the interior of the shell is filled by a kernel of a reddish brown colour, containing a quantity of very fat oil, black, rancid, and excessively acrid. The most marked character of this *Myrobalan* of Egypt, and which distinguishes it from all the other species, is a kind of spongy circle, placed at the point of insertion of the pedunculus, and which surrounds this organ like a little crown.

My investigation was directed to a very remarkable circumstance, which was, that the little basket that contained the *Myrobalan*, contained also *Myrrha* and *Bdellium*, in large fragments. Is this rencontre the effect of chance? or is it an indirect indication that *Myrrha* and *Bdellium* are produced from a vegetable of this genus? And what contributes to add some weight to this supposition is, that several druggists and apothecaries of my acquaintance have frequently brought me the nuts of the *Balanistes*, which they had found in cases of *Bdellium*, and which I have also myself collected, in a similar way, among some recently imported.

My opinion on the Tree that produces the Myrrha and Bdellium.

Myrrha and *Bdellium* are often found among the substances that served for the process of embalming the ancient Egypt-

tians; and Balanistes is found also among them. I have sought to explain the origin of the word Myrobalanus, and I have found that it was formed from two Greek words, *Myrra*, *myrrh*, a perfume, and *βαλανος*, *fructus-glans*, fruit; as if they had said, fruit or acorn of the tree that produces the myrrh, or perfume.*

THEOPHRASTUS, book ix. chap. iv., informs us that the myrrh tree was certainly thorny; *φλοιὺν ἀκανθιωδὴν καὶ οὐ λεῖον*. Now the Balanistes was thorny also.

The opinion of BRUCE, who attributes the Myrrh to a species of Mimosa or Acacia, has long been looked upon as an error, from the circumstance, as Dr. DUNCAN very judiciously remarks, in the Edinburgh New Dispensatory, that mimosas furnish but simple gum, and not the gum resin.

EHRENBERG announces that he has found, both in Nubia and Arabia, a shrub from which he has frequently collected myrrh, similar to the myrrh of commerce.

NEES VON ESENBECK has drawn this shrub from the specimens introduced by Ehrenberg, and which present the generic features of *Balsamodendrum*, or the Amyris of LINNÆUS. Nees calls it the *Balsamodendrum Myrrha*.

But I shall on this subject take the liberty of making an observation similar to that of Dr. Duncan's. The Amyris Opobalsamum, or, as it would be better to call it, the Gilead Balsamodendrum, will be found, on analysis, to produce but pure resin; that is to say, resins or bastard balms, which are perfectly soluble in alcohol and ether, and which do not contain more gum than the produce of the mimosas would resin. Besides, we know, from PLINY and DE THEVENOT, that the trees which produce the myrrh and the bdellium were thorny, and that they grew in the same wood.

I have analyzed a new species of myrrh that has been lately imported, and find that is composed of several principles, as follow:—

* The most part of the other species of the fruit Myrobalanus should have a similar etymology.

Analysis of a new species of the Myrrh of Commerce.

	Parts.
Gum, soluble - - - - -	} 50
—, insoluble - - - - -	
Rosin, soluble, and subresin -	38
Oil, volatile, fluid - - - -	3
A bitter extract, non-resinous -	4
Acid, not determined	
Salt, potass base - - - - -	} 5
— chalk - - - - -	
Silica, adhering only	

 100

This species of myrrh does not differ much in its constituent parts from the ancient myrrh of Troglodytia; but a very important remark, and one first made by myself, is that real myrrh turns red, and even blue, on coming in contact with nitric acid, placed under certain circumstances, which does not happen with the new species.

We are no more acquainted with the tree that produces the myrrh, than we are with the tree that produces the bdellium; but having been frequently struck with the repeated presence of the nuts of the *Balanistes Egyptiaca* with myrrh and bdellium in ancient monuments, and especially in some cases of bdellium recently imported into France, I have no difficulty in supposing that these balanistes may furnish one or the other of these two resinous gums. However, I do not lean exclusively to this opinion; and, as the tree is thorny according to Theophrastus, the presence of the fruit of the balanistes may be accounted for by supposing it to have fallen from some neighbouring tree, at the moment the Arabs were collecting the crops of myrrh and of bdellium.

I relate this circumstance to prove to the Medico-Botanical Society of London, that I have already occupied myself with the proposed question. I will also add, that on the departure for Egypt, in 1829, of the commission of French savans, I gave the necessary instructions for procuring a specimen of the tree that produces the real myrrh; but the labours of this

commission having been directed to objects of antiquity of quite another nature, I have not been able to obtain the information. On the one hand, the French savans ascended the Nile only as far as the second cataract; but it is in a much higher latitude, in a country much more dangerous to traverse, that the tree grows which produces the real myrrh. I possess on this subject some very circumstantial details.

No. 4 is the *Fruit of the Rhamnus Lotus* of the famed tree of the *Lotophagi*.

The fruit of which, sweet as honey, had on foreigners the effect of banishing the regret they felt for their country. This fruit, as is well known, is a species of the Jujube tree, *Ziziphus Lotus*, or may be that of Nabeca, which has an extraordinary sweet taste: it is originally from Africa. The nut is hard, and rather of an elongated shape; the kernel has become black, through the lapse of ages; its resemblance is perfect. This species of lotus, γοτοφαγον δένδρον ζ, was found in a small votive basket, full of offerings.

No. 5. *Fruit of the Pine, Pinus Pineæ.*

It was discovered, as well as a cone of cedar of Lebanon, (*Cedrus Lebani*), in the catacomb of Thebes. These two fruits form a part of the Egyptian museum at Paris: they are the only two of the species that exist in an antique state.

No. 6, are *Seeds of the Lepidium*: λεπιδιον of DIOSCOR.

No. 7. *The Grain or Seed of Mimulus Elengi.*

No. 8 *Corn: Triticum Æstivum*; πυρος of HOMER.

This corn is a little better preserved, and was discovered in a vase of red clay, which was enclosed in the tomb of an agriculturist.

No. 9. *Barley; Hordeum distichum*; χριση, (from the same tomb.)

No. 10. *Raisins; Vitis vinifera*, in a high state of preservation.

No. 11. *Remains of a Crown or Garland*, which I shall call "*Demotique*," or *Popular*.

This garland was generally formed of the leaves of some plant,

the genus of which it is difficult to determine, but it has some relation to *Unona Æthiopica*. The flowers are those of the flowery capitules of the *Mimosa nilotica*. This kind of garland encircled often the bodies of certain mummies from head to foot.

No. 12. *Date*, of the *Phœnix Dactylifera*.

No. 13. *Arequier*, or *Fruit of a new Species of the Genus Areca*;

Called *Areca Pane Lacquæ* by M. KUNTH, the botanist: the living original is unknown.

No. 14. *Lentilles de Peluse*; *Lens Pelusiaca*.

This is the far-famed vegetable which is thought to be a lineal descendant of the lentils, for a plate of which Esau sold his birthright to Jacob. These lentils are of a much smaller species than those at present used in France.

The lentils of Pelusium are at present cultivated in the environs of this Egyptian city, in the neighbourhood of that branch of the Nile called Pelusiad, and from which the species derives its name. This vegetable is extremely difficult to naturalize in France. I send some to Mr. HUMPHRY GIBBS, in order to make the experiment of raising them in England; an experiment, the result of which I request he will communicate to me at a future period.

No. 15. *Another Leguminous Seed*.

This seed, which I lately discovered in a small vase of clay, is extremely rare. I have not been able to determine its species: whether it is a *Lathyrus*, a *Cicerula*, or a species of *Trigonella*, I am ignorant. This seed is smooth, because it is deprived of the pellicle that surrounded it; it is of an iron red colour.—*Lond. Med. and Physical Journ.*, November 1832.

ART. XXVII.—REMARKS ON THE JURIBALI, OR EURIBALI, (so called by the Natives,) a *Febrifuge Bark Tree of Pomeroon.*

By JOHN HANCOCK, M. D.

THIS tree is found in the forests not far distant from the coast. It is small, seldom exceeding thirty feet in height, and eight or ten inches in diameter at the base. It belongs to the eighth class and first order of the sexual system of Linnæus, and to the natural family of Meliaceæ of Jussieu. The calyx is very small, of one leaf, entire. The corolla consists of four petals, lance-ovate, white, spreading. The nectarium is a monophyllous, bell-shaped tube, eight-toothed, bloated or inflatè, bearing the stamina in its clefts or notches: this part is described by several authors as the filaments united. The stamina are without filaments. The anthers are eight in number, ovate, erect, seated upon the mouth of the nectarium. The germ is obtusely conic and pubescent. The style is very short, bearing capitate, or rather coronate, stigmata. The pericarpium is a capsule, ovate, one-celled, trivalved, the valves bearing rudiments of septa at their extremities: it contains a single seed, which is roundish, black, crowned with a trifid wing, arillate on one side only; it is veined, and resembles the nutmeg in shape, but is only half its size, with a fleshy albumen and foliaceous cotyledons. The flowers are numerous, on long, lax, divaricate panicles.

Nature has distinguished this tree in a very remarkable manner; for it may be truly said to bear two distinct kinds of leaves, the stipules being, at certain seasons, so developed as to be not unfrequently confounded with the common leaves of the tree, but are distinguished by their shape and position. They are placed in pairs, and scattered along the branches; ear-shaped, or rounded and varied, obtuse and petiolate.

The common, or proper leaves, are alternate, oblong, pointed; they are scattered, without much order, on the branches; the petioles are short, compressed, and channelled. The bark is rough and gray externally, and, on peeling it from the tree, the epidermis scales off, and leaves the true bark of a smooth red surface. Its odour is peculiar, some-

what like that of tea-leaves. The wood of the trunk is dense and whitish; that of the branches somewhat coloured, and traversed by a pith in the centre. The seed, crowned with a foliaceous appendage, corresponds with that of the first tribe, Meliaceæ, of De Candolle; in other respects, to his second tribe, Trichiliæ.*

In respect to the calyx, (being quite entire,) it seems unique, as all the others of the order are divided or dentate. The structure of the flower, in all other respects, is strictly conformable to the order Meliaceæ; whilst, in the fruit, (a single-seeded capsule,) it agrees with very few of them: in one species only, *Trichilia moschata*, we observe it noted *Capsulis submonospermis*.

The most remarkable disparity, however, seems to be in the presence of stipulæ, which have hitherto in no instance been observed in this order.

The Juribali, therefore, will be found, I presume, to constitute a distinct genus from any yet described: it so appears, at least, by comparing it with the forty-fourth order in De Candolle's prodromus. The admirable arrangement, conciseness, and precision of this work enables us, at one glance almost, to observe the actual state of the science, so far as it goes, and, when completed, it will furnish an invaluable treasure to the botanist.

The bark of the Juribali gives a deep and lively red colour to water and spirit, in both of which its virtues are very soluble. It is a very potent bitter and astringent; in these qualities much exceeding the Peruvian bark, and will often be found to succeed after the latter has failed to remove an intermittent. I have commonly employed it in about half the quantity I should do for a corresponding dose of the Peruvian bark, to which, in fevers of a malignant and typhoid nature, it appears to be far superior. Notwithstanding its astringen-

*The learned author has this remark on the order Meliaceæ: "Ordo non satis definitus et forsân typos plurimos diversos colligiûs sed ob descriptiones plurium generum maneat, in statu scientiæ præsentî extricatu difficillimus et botanis heritis commendandus." Pars i. p. 619.

cy, it does not, like Peruvian bark, constipate the bowels or affect the head, but generally opens the pores of the skin and promotes diaphoresis. To render it still more effectual, it should be taken warm.

More than one-fourth the weight of this bark is soluble in water, whilst, according to Fabroni's experiments, the cinchona yields but about one-sixth or one-eighth. The active principle appears to be readily soluble in aqueous menstrua, and is therefore taken with much more facility than an insoluble woody mass, which passes the throat with difficulty and disgust, and often lies a heavy, indigestible load on the stomach. Such considerations may one day appear of more importance than at present, when the prevailing infatuations respecting quinine and the new alkaloids shall have subsided, and given place to the exercise of sober reason and the examination of new doctrines by careful experiment.

I shall here notice the results of a few chemical experiments made on this bark, although I must confess I consider their action to be of very little consequence in elucidating the medicinal powers of any vegetable remedy. Gelatin forms with the infusion a precipitate of a reddish brown colour. Emetic tartar, nitrates of silver and mercury, acetates of lead and of alumina, all throw down precipitates of a light yellow colour; sulphate of copper affords a gray, and sulphate of iron a greenish blue precipitate. The carbonates of potash and soda render the infusion red brown, but form no precipitate. Lime water first renders the infusion green, then deep red, and throws down a copious precipitate of the same colour.

These experiments were made for the sake of comparison, consecutively with others, on infusions of cinchona of more marked sensible qualities, but which I could not refer with any certainty to their species. The results were in some cases similar, in others widely different in respect to the action of reagents; i. e. on the infusion of the Juribali and the cinchonas.

The recent decoction or infusion is of a red colour, but remains turbid for some days. After infusing it for two or

three weeks, it gradually assumes a deep red tinge, more transparent, having deposited a flocculent sediment. In this state it gives a durable red colour to stuffs, and precipitates the infusion of galls, which the recent infusion does not.

It hence seems to be probable that, by the combination, or through some slight acidity, the infusion possesses the power of dissolving an alkaline principle, perhaps cinchonine, which is not taken up by pure water, or at least is not indicated in the recent infusion. It might be interesting to ascertain if the sulphuric or muriatic acids would evolve an alkaloid similar to those which are found in certain species of the genus *cinchona*.

The bark contains a resinoid extractive, which is soluble in boiling water, but not in cold; the decoction, therefore, becomes turbid on cooling, and gradually deposits a red powder. This deposit is soluble in alcohol, and appears to be a simple resin, and not the active principle of the bark; it is insipid when washed in cold water. From this, and some other experiments, I concluded that *cold* water took up the *active* parts as well as hot.

This bark not only cures intermittent fevers, but remittents, also those of a typhoid malignant kind, and those destructive fevers in which the *cinchona* often does more harm than good. In some measure it emulates rhubarb, being cordial and purgative according to the dose; it is also a powerful diaphoretic, especially if taken warm, by which its value is certainly much enhanced as a febrifuge. I have used it in agues and in the malignant remittent fevers of the tropics, very freely, with the most decisive success, always in the form of infusion, commencing at any time or stage of the fever that may be present. By infusing an ounce of the bark in a quart of hot water, and giving a glassful once in two or three hours, I think it bids fair to be a useful remedy in smallpox and measles.

In a few instances the pulse seemed to be accelerated after its use, but was generally rendered slower and fuller; but I never ascertained the conditions of the patients under which these different effects took place, to my own satisfaction.

Before quitting the present subject, I beg leave to allude to an opinion which has long prevailed in my mind, and which may be a novel one, or may not; but I have never heard or seen it adverted to, and, if correct, it may be worthy the candid consideration of the members of this Society, and the profession at large.

We must all admit the great value and important advantages derived from the Peruvian bark in the practice of medicine. It is chiefly in fevers that its uses are to be regarded as paramount; but let us consider how far it is entitled to such unlimited encomiums as a febrifuge. It is certainly excellent as a tonic, and as such, is applicable in the treatment of very many disorders. It affords one of the most efficient means of suspending the returns of the *common* intermittents. I say common, because, in the very malignant and bilious intermittent fevers of warm countries at least, often met with, it does more harm than good; and in the ardent, typhoid, and remittent fevers, and where most danger lies, we find its uses to be the most equivocal, and not unfrequently to produce a fatal metastasis on the brain: and in such fevers, those of the most dangerous tendency, it is rarely prescribed till the fever has subsided, when the skin has become moist, the tongue cleaning, sediment in the urine &c., before the main remedy can be exhibited; and thus the time must be frittered away in *expectancy*, whilst the disease is making its inroads, until it has worn itself out, and the principle of life, perhaps, along with it.* When debility is the chief symptom prevailing, and when, in most cases, the danger is actually over, the bark is thrown in, and gets the merit of the cure! Under this view, therefore, it seems to me, that its uses are not so strictly what its title *febrifuge* imports. It is not so much to *drive away* the fever, as to prevent its recurrence, when nine times in ten *dangerous* remittent fevers will not recur after once coming to a crisis. A real and genuine febrifuge, I should conceive, is that which not only braces the nerves as a preventive, but

* Our profession has given too much reason for the satire of Voltaire, when he remarks, that "Nature cures diseases, and the physician assumes the credit."

which is capable of *driving away* or taking off the febrile paroxysm. Such is the true meaning I should attach to a febrifuge or an antifebrile remedy, and as such I conceive the remedy here recommended to be. But I shall leave the subject to the examination of better qualified judges.

This is, as before mentioned, but a small tree; there is another which grows very large, often confounded under the same name by the Arowaks: it is the *Icica altissima* of Aublet. The remarkable large stipula, however, distinguishes the right kind most readily from every other tree which might otherwise resemble it; the scaly cuticle is also a good mark of distinction.

My experience is chiefly confined to its use in fever, but it may doubtless be regarded as a general tonic, and applicable, perhaps, in most cases as a substitute for the cinchona; externally it is found to be a very useful application to foul and illconditioned ulcers, either in powder or decoction.

There is another tree of the inland parts, called *Caramata*, and *Arumari* by the natives, which affords likewise a very valuable remedy, a very bitter bark, which, from many trials I have made in those cases, appears to be equally safe and efficacious in those dangerous typhoid and remittent fevers in which the cinchona is either useless or pernicious, especially when exhibited during the febrile excitement. Being partial to the combination of similar remedies, I have in a few instances, when both happened to be at hand, infused the two barks (Juribali and Caramata) together, half an ounce of each, grossly powdered, to a quart of boiling water, giving the patient a wineglassful of the infusion, kept warm before the fire, once in two to four or six hours, according to the urgency of the case, and it has appeared to me to operate in this way with uncommon efficacy: but no one person singly is fit to decide upon the positive or comparative merits of a new remedy; and I shall, with great pleasure, submit these two medicinal barks, for further proofs and experiments, to the learned members of this Society, together with some imperfect botanical specimens of the trees from which they are procured; and, being soon to return to British Guiana, shall

not fail to forward to the Society sufficient supplies* for making the requisite trials of their virtues, being fully convinced that no institution can afford such advantages as the Medico-Botanical Society for proving and fully investigating all the details which are requisite for the complete development of the powers of new remedies, and for deciding on their real or imaginary virtues.

ART. XXVIII.—*New Researches on Opium.* By S. PELLETIER.

FIRST PART.

Analysis of Opium.—A kilogramme, ($2\frac{1}{2}$ lbs.) of brittle Smyrna opium, was contused and macerated in two kilogrammes (five pounds,) of cold distilled water, the solution of the opium was aided by kneading it; the fluid was decanted from the marc, and the latter was four times successively, treated in the same manner, and washed under a small jet of water. The solutions were added together and evaporated with great care, to obtain a solid extract.

The opium was thus divided into two portions—one soluble in cold water, the other insoluble. We shall distinguish the first by the name of extract of opium, and the latter by the name of marc. The relation between them varies; we have never found it more than 12 of extract to 4 of marc.

Examination of the Extract of Opium.—The extract was redissolved in distilled water, when it deposited a brilliant, and as if crystalline, substance; this washed, dried, and dissolved in alcohol, crystallized in pearly, flattened prisms. It was narcotine, without a trace of morphine. It was by thus treating opium by water, that M. Derosne first obtained narcotine. We shall hereafter see that the greatest part of the narcotine contained in opium remains in the marc, that is, in the portion not dissolved by the water.

The solution of the extract of opium, from which the nar-

* I have been extremely disappointed of these, and numerous other interesting articles, which were promised to be forwarded from the same quarter, during my abode in England.

cotine had been thus separated, if not wholly, at least for the greatest part, was heated to 212° F., and ammonia added; the first drops of this caused a precipitate which was redissolved in the liquid, an excess of ammonia was used, to be certain of decomposing the whole of the salt of morphine; but, as the morphine is slightly soluble in ammonia, the ebullition was kept up for ten minutes to drive off this excess of alkali. The mixture was then slowly cooled, and finally placed in a very cool situation—when the morphine precipitated in a crystalline form. There was a crust on the surface of the liquid, formed of morphine mixed with a substance of a resinous appearance.

If the boiling solution of opium, containing the excess of ammonia, be filtered, the clear fluid that passes through affords on cooling, a considerable quantity of morphine, much more, indeed, than might have been presumed, from the insolubility of morphine in water. This may be explained, by an observation of M. Buisson, which is confirmed by my experiments, that at the boiling point, morphine decomposes in part the ammoniacal salts, and gives rise to triple salts which are themselves decomposed on cooling, under the influence of an excess of ammonia and the force of cohesion.

The morphine obtained by crystallization from the filtered boiling solution, is very beautiful; that, on the contrary, which remains on the filter is black, and mixed with much of the resinous matter. The morphine separated from the cold solution by the ammonia, is far from being pure; in fact, if it be treated by sulphuric ether, this latter acquires a yellow colour, and on spontaneous evaporation affords an oily substance, in which crystals of narcotine, and the substance hereafter to be spoken of under the name of meconine, may be perceived.

The modes of purifying morphine are well known—they consist in dissolving and crystallizing it several times, in treating it by boiling alcohol, adding a little animal charcoal. The morphine ought then to be reduced to an impalpable powder, and subjected to the action of sulphuric ether, which dissolves the narcotine. At the same time, it is very difficult by this

means, to obtain morphine perfectly free from narcotine. I prefer dissolving the morphine in sulphuric acid, and thus forming a sulphurate which readily crystallizes. By this mode, the narcotine is entirely separated; for if an excess of acid is not used, the narcotine remains undissolved, whilst if it be dissolved by an excess of acid, the narcotine does not crystallize, and remains in the mother waters. It is almost superfluous to add, that the sulphate of morphine must be decomposed to obtain the morphine; for this purpose magnesia is preferred. The sulphate of magnesia is removed by washing, whilst the morphine remains with the excess of magnesia, and can be taken up by alcohol.

After having separated and obtained the greater part of the morphine contained in the solution by means of ammonia, the mother waters are evaporated one-half. On cooling they deposit an additional quantity of morphine, which must be purified as above. In the fluid from which the morphine has been separated, I found barytes water, which immediately occasioned another precipitate. It was from a similar precipitate that Seguin obtained the acid of opium. Sertuerner, by using the muriate of barytes, produced an analogous precipitate.

To separate the meconic acid from the barytes, Sertuerner and Robiquet advise washing the precipitate with distilled water and decomposing it by a slight excess of sulphuric acid diluted with water; the sulphuric acid takes up the barytes. By evaporating the liquid with care, and permitting it to cool, the meconic is obtained in crystals; these may be purified by washing them with a little cold water, and drying them by a gentle heat; they may also be sublimed by cautiously heating them in a glass retort.

I have modified this in one particular only, but this I conceive to be important. It consists in several times treating the meconate of barytes, with boiling alcohol, before subjecting it to the action of the sulphuric acid; by this means, the meconate is deprived of a brown colouring matter, which would otherwise remain united to the meconic acid, and would retard its crystallization. Care must also be taken, not

to use too much sulphuric acid, as on the concentration of the solution, it reacts on the meconic acid and chars it. I am also of opinion that meconic acid should not be sublimed, as the sublimed acid does not appear to be absolutely identical with that which has not undergone such an operation.

The solution of the extract of opium, from which these three crystalline principles, viz. narcotine, morphine, and meconic acid were separated, was treated by subcarbonate of ammonia, to separate the excess of barytes used. By heating the solution, the excess of the ammonia was driven off, and the fluid was evaporated to a syrupy consistence, and left for several days in a cool place; when it assumed the appearance of a pulpy mass, in which crystals were to be remarked. This mass was drained and then strongly pressed between cloths. In this state it was treated by boiling alcohol of 40° B, which dissolved a portion of it, and left a black viscous matter, to be noticed hereafter.

The alcoholic liquors were subjected to distillation, and by this operation reduced to a small bulk. On cooling I obtained a crystalline substance, which was easily purified, and became of a dazzling white colour, by dissolving and crystallizing it several times. This substance, which I recognised as entirely new, was soluble in boiling water, and was readily purified by solution and crystallization in water; and was obtained very white by heating it with purified animal charcoal. To this substance I have given the name of *narceine*, and which will be shown to differ essentially from morphine, narcotine, and a third crystalline substance which has been designated by M. Couerbe as *meconine*.

This latter substance often accompanies the narceine, crystallizes with it, and is always to be met with in the mother waters which have produced the narceine. The narceine being soluble in ether, these two substances may be readily separated from each other. It was by treating what is known in manufactories, by the name of the fatty matter of morphine, by ether, that M. Couerbe first obtained meconine in 1830, when being the head of my chemical establishment, he operated on large quantities of opium. From these data,

it was natural for us to seek for meconine in the mother waters of narceine—for this purpose, we treated these mother waters, and those which had furnished the pulpy matter, with sulphuric ether. The ether acquired a yellow colour. On evaporation it produced crystals imbedded in a fatty matter; these crystals were meconine, which might have been obtained white, by a second crystallization; but to insure their purity, they should be treated with boiling water, in which they are soluble, whilst the fatty matter and a small quantity of narcotine remains unacted upon. The narcotine can then be taken up and the fatty matter separated by means of hydrochloric acid.

Meconine is a substance which possesses very singular chemical properties, and is well entitled to a separate notice, but this I leave to M. Couerbe, who is at present engaged in the examination of it.* But though this substance is wholly different from morphine, narcotine, and narceine, I think it right to state that it appears to be identical with the peculiar substance found in opium by M. Dublanc, jr. and which was described by this gentleman in a memoir presented to the Royal Academy of Medicine in 1826, and which has recently been published in the *Annales de Physique et de Chimie*.

However, it is not the first time that the same substance has been discovered by two chemists, unknown to each other. I can state that M. Couerbe had no knowledge of the labours of M. Dublanc, and shall at present confine myself to identifying the existence of meconine as an immediate principle, and showing how it is to be obtained, in the systematic process I am endeavouring to lay down for the analysis of opium.

Continuing the analysis of the soluble portion of opium, and from which, narcotine, morphine, meconine, narceine and meconic acid have been separated; it remains to examine the viscous black substance, remaining after the solution of the meconine by ether. This substance, when dissolved in water, leaves an insoluble residue, analogous to the marc of opium, of which we shall presently speak; this insoluble portion, may be considered as mixed with, and even held in solution, by the influence of the other principles. The

* See page 52. vol. 5.

portion of the black viscous matter which was soluble in water, appeared to contain a substance which had acid properties, that is, of uniting with salifiable bases, and of precipitating certain metallic salts. This acid substance is mixed with a brown matter which adheres to it in all its combinations, and it is difficult to decide whether it is not this brown matter that performs the part of an acid. However this may be, this matter is also mixed with a gummy substance, and with more or less of the various substances already spoken of. To obtain it as pure as possible we precipitated it by a salt of lead. After having separated from it a gummy matter, insoluble in alcohol, the precipitate was washed and treated with sulphuretted hydrogen, when the fluid not only became acid, but also highly coloured. As I have not been able to obtain this acid in a colourless, crystalline or volatile state, or enjoying characteristic properties, I shall not hazard an opinion as to its nature.

Examination of the Marc of Opium.—It is well known that in treating opium by sulphuric ether, a tincture is obtained, which, on spontaneous evaporation, affords three substances, which may be imperfectly separated from each other mechanically. The first of these is narcotine, the other is a sort of oily matter, and the third is that to which Robiquet has given the name of caoutchouc. The marc of opium heated in the same way, furnished the same products—but I did not pursue this method, as the substances thus obtained could not be perfectly separated from each other.

The marc of opium was treated with alcohol at 36 degrees. I aided the action of it by applying heat, but not to the boiling point, and did not filter the solutions until they had become cool, experience having taught me, that the substance called caoutchouc, was scarcely soluble in hot alcohol, and that the little that remained so, separated on cooling. I therefore designedly left it in the marc.

The alcoholic solutions distilled to two-thirds, furnished on cooling a considerable quantity of narcotine. The alcoholic mother waters became too aqueous, and were evaporated to dryness in a water bath; the residue dissolved in boiling

alcohol at 36° , also afforded narcotine on cooling. When, on repetitions of the same process, no more narcotine was obtained, the residue, which was a soft, fatty, unctuous mass, of a blackish brown colour, was subjected to the action of boiling water, several times; at first the water was deeply tinged of a blackish brown colour, but at last was colourless. These solutions, on evaporation, afforded crystals, which were removed as soon as they formed, by means of a silver skimmer. The residue was an extractive matter, which had all the characters and properties of the gummy extract of opium; the crystals were narcotine.

The marc, notwithstanding the numerous washings to which it had been subjected, still retained a little extractive matter, which proves that after having exhausted the action of one solvent on a vegetable substance, that this same agent ought again to be made use of, after certain principles which, from their bulk, opposed its action, have themselves been subsequently removed by other agents.

The unctuous matter, thus freed from the extractive parts, was wholly soluble in alcohol at 40° . It may be well to notice a fact in this place, which will interest those chemists who are engaged in vegetable analyses. Before I perceived that the unctuous matter contained some extract of opium, of which it could not be freed by repeated washings with boiling water, even when it was two or three times redissolved in weak alcohol, to renew the surfaces; I thought it advantageous to subject it to the action of boiling alcohol at 40° , but as on cooling, there was a separation of a substance of a resinous appearance, whilst by the evaporation of the cold filtered liquids, I obtained a resinous matter, soluble in alcohol, I was induced to admit that opium contained two resins, whilst in fact there is but one substance to which this name can be applied, as will be hereafter seen. I mistook for a peculiar resin, characterized by its insolubility in cold alcohol, a mixture or indefinite combination of the unctuous matter with the extract of opium. To return to this unctuous matter, freed from extractive matter: this matter, treated by sulphuric ether, separated into two portions, one soluble in the

ether, the other, friable, brown, and insipid; which, as I shall show in the second part of this memoir, is the true resin of opium, which hitherto had not been isolated, and which had been confounded with caoutchouc of opium and the oily matter, which latter is obtained by the spontaneous evaporation of the ether. This oleaginous matter is soft and almost fluid, is soluble in alcohol and the oils; its taste is acrid and burning, which would seem to show that it must have action on the human economy. We shall again advert to this substance. However, as it still retains some narcotine, which adheres to all the matters soluble in ether, and which we had not entirely separated by the repeated crystallizations, it is necessary to entirely remove the fatty matter from it, to treat this substance with water, acidulated with hydrochloric acid; the narcotine is dissolved, and the fatty matter wholly deprived of it, floats on the surface of the solution.

The portion of the marc from which the alcohol had taken up all that was soluble, was subjected to the action of ether, which became coloured; and it required several treatments with this menstruum before the marc was exhausted. By spontaneous evaporation of the ether, I obtained a brown and very elastic substance, this was the caoutchouc of M. Robiquet; by treating it with boiling alcohol, I separated some oleaginous matter and a little narcotine; the caoutchouc then became more firm, was less viscous, and perfectly resembled, in its physical character, the real article.

Although it does not comport with my plan to speak of the properties of the immediate principles of opium in this place, I think it right to remark, that the three substances obtained from the marc of opium by alcohol and ether, differ from each other, in the resin being soluble in alcohol and insoluble in ether, whilst the caoutchouc is soluble in ether and insoluble in alcohol, and the oily matter is soluble in both these fluids.

The marc exhausted by alcohol and ether was then treated with naphtha, but afforded nothing to this liquid. It is to be remarked, however, that if naphtha be used before the ether, that it dissolves the caoutchouc; but it is better to employ the ether for this purpose, as the caoutchouc can never be entirely freed from the naphtha.

The marc, after these various operations, was reduced to a very small bulk. Recollecting that it had not yet been subjected to the action of boiling water, and wishing, moreover, to ascertain if the assertion of M. Seguin was correct, that it contained an amylaceous matter; I boiled it in distilled water; the water became frothy, and slightly opalescent; it was rendered a little turbid by alcohol and the subacetate of lead, but it struck no blue colour with the tincture of iodine, or with the hydriodate of potassa and chlorine. Hence, there was no starch, and the small quantity of the substance which had been dissolved by the boiling water was rather gummy than amylaceous. However, only traces of gum could be detected, for the gum must have been dissolved in the cold water; and formed, in all probability, a part of the uncrystallizable substances which accompanied the brown acid. The residue appeared to be formed of two very distinct substances; one fibrous, was evidently woody fibre, and could be taken up with small forceps; the other, having the appearance of bran, was not readily recognizable by its external characters, and was therefore subjected to experiments. Burned on live coals, it gave out a smell which was a union of that of vegeto-animal matter and of woody fibre; treated with a solution of potassa, it swelled and finally dissolved. From these and other characters, I recognized it to be bassorine, or the base of gum Basora.

From this analysis it appears that opium is composed of at least twelve substances. Of these, five can be obtained perfectly white, and in a crystalline state, viz. morphine, narcotine, meconine, narceine, and meconic acid. The others, which are not crystalline, may, however, with the exception of the brown acid, and perhaps the gummy matter, be considered as immediate principles, as will be shown in the second part of this memoir.

Principles in Opium. 1. Narcotine. 2. Morphine. 3. Meconic acid. 4. Meconine. 5. Narceine. 6. Brown acid and extractive matter. 7. Peculiar resin. 8. Fat oil. 9. Caoutchouc. 10. Gum. 11. Bassorine. 12. Woody fibre.

Opium also appears to contain a volatile principle, which impregnates water distilled over it.

ART. XXIX.—*On the Medical Properties of the Piscidia Erythrina, or Jamaica Dogwood.* By WILLIAM HAMILTON, M. B., Corresponding Member of the Medico-Botanical Society.

THE Jamaica dogwood tree, or *Piscidia Erythrina*, is a small branching tree, of from fifteen to twenty feet in height, common in the low grounds near the sea, in most of the West India islands, and every where by the road sides (according to JACQUIN) in Jamaica, where it flowers, according to my observations, in the months of March, April, and May, during which it is wholly destitute of leaves, which rarely appear before the period of inflorescence has passed. It belongs to the Linnæan class and order of *Diadelphia Decandria*, and is distinguished from other plants of the same class and order, by its acute stigma, and four-winged legume, enclosing a number of compressed, oblong-reniform seeds. Its leaves, which are periodically deciduous, are unequally pinnated, with ovate, very entire, pubescent leaflets. Towards the middle or latter end of March, thyrsoidal racemes of white papilionaceous flowers, of rather a large size, wholly destitute of smell, make their appearance at the extremities of the younger branches, and continue progressively expanding till about the middle of May, when they are succeeded by clusters of linear compressed legumes, furnished with four membranaceous, longitudinal wings, greatly exceeding the legume itself in breadth; the legume consists of one cell, nearly united between the seeds, so as to appear to a careless observer like a many-celled legume. The seeds, which I have always observed to be very much compressed, and of an oblong reniform shape, SWARTZ describes as roundish.

According to Jacquin, the leaves and branches of this tree, bruised and mixed with water, intoxicate the fish it contains, making them swim blindly on the surface, so as to become an easy prey to the fisherman: his words are, “*Folia ramulique contusa, et aquis injecta, pisces inebriant, ut aquis supernatent, manuque capi possint: quam virtutem cum multis aliis*

plantis Americanis communem hæc arbor possidet." Among the other West India plants to which he refers in the concluding part of the sentence as sharing this property of intoxicating fish, are the *Jacquinia Armillaris*, called by the Spaniards *el Barbasco*, by the French *Bois bracelets*, and by the English *piecrust*, a low but ornamental shrub common on the seacoast in most of the Antilles, and an ingredient in one of the most deadly of the toxiques of South America; the *Gallega toxicaria*, and a plant of which I have never been able to obtain any true account, which the Caribs of St. Vincent were said to employ, in a somewhat different manner, for the same purpose, under the name of *Wonga root*. From the similarity of the effect produced by all these various substances on the animal economy, it is not unreasonable to conjecture that this uniformity of action arises from the uniform presence of the same active principle in each, analogous to the morphine, quinine, tannin, &c., which are found to pervade a variety of dissimilar plants, communicating to them, however, a similarity of properties, more or less decided, according to the degree of concentration in which it exists in each. Hence it might be worth while to subject them all to the test of medical experiment, in order to determine how far their active properties are capable of being rendered subservient to the wants of mankind.

The bark of the dogwood root, previous to being used for fish poisoning, as the sport is called, is macerated with the lees of the stillhouse, and temper or quicklime; and put into baskets of a convenient size, with one of which each of the fishermen is provided: thus equipped, one or more of them embark in one or more boats, according to the size of the bay selected for the sport, and pushing to a sufficient distance from the shore, they hold their baskets over the side of the boat in the water, which they continue to agitate with their baskets till the whole of their contents is washed out, and the water has become impregnated with the intoxicating preparation, which happens sooner and to a wider or narrower extent according to the number of washers and boats, and the dimensions of the bay. In a little time the smaller

fish are seen floating, apparently dead, upon the surface of the water, while the larger fish, capable of longer resisting the stupifying influence of the medicated water, swim wildly about, raising their heads above the narcotic fluid, and striving, as it were, to breathe a purer atmosphere: these surrender themselves an easy prey to the persons in the boats, who catch them with their hands as they float by, perfectly unresisting; if thrown, immediately after being taken, into fresh and pure seawater, there is no doubt but that, with the exception perhaps of the smaller fry, they would soon recover. Neither their flavour nor wholesomeness is in the least impaired by the manner in which they have been taken; but, from the number which are uselessly destroyed by this mode of taking fish, poisoning has been prohibited in many of our islands. The manner in which the Wonga root was used by the Carribs differs in appearance from this, which I myself witnessed, but in principle is indisputably the same: they stuffed, as I was informed, the bellies of several small fish with a preparation of the root, and threw the fish thus doctored overboard, when they were devoured with avidity by the larger fish: these latter being stupified by the dose, became, in their turn, the prey of the ichthyophagists in the boats.

Struck with the singular and decided effect of the dogwood bark upon the fish, I was induced to investigate its properties as an internal remedy upon the human frame, and commenced, accordingly, a series of experiments upon myself with the bark, in substance, in infusion, in decoction, and in tincture; which last I found to be the only efficient and practicable mode of exhibition, since the active constituent appears to be a resin insoluble in any thing but rectified spirit: hence the necessity of the stillhouse lees, which contain alcohol in a highly concentrated state, in combination with a powerful and deleterious empyreumatic oil, in the preparation of the bark for fish poisoning.

My tincture was prepared by macerating one ounce of the coarsely powdered bark in twelve ounces, by measure, of rectified spirit, which I had brought with me from England, for twenty-four hours, and straining. The tincture thus ob-

tained was of a fine honey yellow, and appeared to be fully impregnated with the active principle of the bark: it had nothing striking or offensive in its taste or smell, but, on being dropped into water, it communicated to it an opaline or milky hue, evidently from the separation of a resin; for, on suffering some of the undiluted tincture to evaporate in a glass, the sides were incrustated with a white film of the resin which remained behind. Labouring at the time under a severe toothache, which seemed to set sleep at defiance, I took at bedtime a drachm measure of this tincture in a tumbler of cold water, and laid down, with the uncorked phial in the one hand and the empty glass in the other, to speculate upon the manner of its operation on the system. The dose was by no means disagreeable to take, nor was its action on the mouth and throat unpleasant, like that of the bark in substance, which irritated the fauces like the *Daphne mezereum* or the croton oil; but, soon after swallowing the dose, I became sensible of a burning sensation in the epigastric region, spreading rapidly to the surface, and terminating in a copious diaphoresis, in the midst of which I was surprised by a sleep so profound that I was utterly unconscious of existence from about eight o'clock at night till eight the following morning, when I awoke free from pain of every description, and found myself still grasping the uncorked phial in one hand, from which not a drop had been spilled, and the empty glass in the other. No unpleasant sensation followed, as is usually the case after opiates, from the exhibition of what was perhaps a needlessly large dose; nor did a friend, whom, though in perfect health, I persuaded to repeat my experiment in his own, suffer the slightest inconvenience from an equally full dose; his only observation was, that he never had slept so sound in his life as he did that night. I next tried its efficacy as a topical application in cases of carious teeth, introducing a pledget of cotton, impregnated with the tincture, into the cavity, and never knew an instance of a return of pain after this application. Experiments are yet wanting to determine the minimum doses requisite in both cases, and these it were much to be desired to have instituted by some medical prac-

tioner resident in the West Indies ; taking care, however, to employ bark gathered about the full moon in April, when the plant is in flower, and the best rectified spirits, or even pure alcohol, in his experiments. An inattention to these cautions will completely defeat the object of the experiments, and, in place of obtaining an active and valuable medicinal preparation, he will obtain one perfectly worthless and inoperative.

Lond. Med. and Physical Journal.

ART. XXX.—*Remarks on the Euphorbia corollata.* By
WILLIAM ZOLLICKOFFER, M. D.

To such as are desirous of becoming acquainted with the remedial virtues and consecutive therapeutic operation of the vegetable productions which are indigenous to the United States, it is presumed no apology is necessary for my again intruding on the medical community, with another communication that ranges within the limits of the medico-botanical literature of this country ; and to those who entertain the sentiment, that the list of our native medicinal agents is at present sufficiently enlarged to effect all that can be accomplished by physical powers ; and who presume, that our knowledge upon this subject has attained its ultimate point of improvement, and consequently display no interest in the subject of its ultimate furtherance, the opinion of a distinguished correspondent would seem to be peculiarly appropriate, in avowing that, “from minds capable of adopting such a sentiment science can receive no impulse, and human intelligence no especial illustration.”

The *Euphorbia corollata* first attracted my attention in the year 1819 ; and in the spring of 1821, I transmitted several of its recent roots to Professor BIGELOW, who transplanted them in the Botanic garden, and in his *American Botany* he has described and figured the plant.

The genus *Euphorbia* was placed by LINNÆUS in the class *Dodecandria*, and the order *Trigynia*. MICHAUX has transferred this genus to *Monæcia*, *Monadelpkia*. It belongs to

the natural orders of *Tricoccæ* of LINNÆUS, and *Euphorbiæ* of JUSSIEU.

GENERIC CHARACTER.—The flowers of the genus *Euphorbia* are characterized by a *calyciform involucre* with *four or five segments*, like *petals*, and the same number of *interior segments* like *nectaries*. *Stamens* twelve or more. *Filaments articulated*. Fertile flower *solitary, stipitate, naked*. *Styles three, bifid*. *Capsule, three-seeded*.

SPECIFIC CHARACTER.—The species *corollata* is distinguished from all of the other individuals belonging to this extensive genus by its *five-rayed umbel*, which is *three-parted* and *dichotomous*. The *leaves* and *involucra* are *oblong* and *obtuse*. The *segments* of the calyx are *obovate, petaloid, and coloured*.

Professor Bigelow has given the following excellent description of this plant. He says it

“Has a large branching root, which sends up a number of stems, frequently from two to five feet in height. They are erect, round, and in most instances simple. The leaves are scattered, sessile, oblong, obovate or linear, a little revolute at the margin, smooth in some plants, very hairy in others. The stem divides at the top into a large, fine-rayed umbel, supported by an involucre of as many leaves. Not unfrequently a small axillary branch or two arise from the sides of the stem below the umbel. The rays of the umbel are repeatedly trifid or dichotomous, each fork being attended by two leaflets and a flower. The top of the stem or centre of the umbel is turgid, and often bears a precocious flower. The calyx is large, rotate, white, with fine obtuse petal like segments, from which the name of the species has been taken. The nectaries or inner segments are fine, very small, obtuse projections, situated at the base of the segments. Stamens a dozen or more emerging, two or three at a time with double anthers. Germ pedicelled. Capsule three-celled.”

The *Euphorbia corollata* is a very common plant in some parts of Virginia and Pennsylvania. In some districts of Maryland, and more particularly in Anne Arundel county, it grows in the greatest abundance, where it is recognized by the common and local appellations of *milkweed*, *snake's milk*, *ipe-*

cacuanha, and *Indian* physic. It delights and flourishes in a poor, dry, and sandy soil. It is rarely discovered in the woods, but in fields which are cultivated every two or three years. The farmers in Anne Arundel county, where the fields are literally overrun with it, have frequently told me that the small grain sustains considerable injury from its rapid growth in the early part of the spring, checking the natural process and progress of vegetation in the grain, and that the ordinary means which are made use of, (such as ploughing and harrowing,) in order to kill bluegrass, have the effect of increasing the quantity and rapid growth of this plant. It is never eaten by animals. The stalks which arise from the common trunk of the root, are sometimes as many as thirty, and from this down to a single one. The largest roots that I recollect seeing, measured from an inch to two inches and a half in circumference.

Solubility.—Alcohol, wine and water are the best menstrua for extracting its active qualities. The alcoholic and watery extracts are equally active. Two thousand one hundred and sixty grains of the recent root afforded one hundred and two grains of aqueous extract; and the same amount, by digesting in alcohol, gave one hundred and twenty-three grains of alcoholic extract.

Desirous of ascertaining the relative proportions of *epidermis*, *cortical*, and *ligneous* matter entering into the organization of the root of the *Euphorbia corollata*, I selected a portion of healthy root, which weighed 893 grains: on examination the *epidermis* weighed 84 grains, the *ligneous* or woody part 189, and the *cortex* or bark 620. From these results it seems that the root is made up of nearly two-thirds of the part in which its activity exclusively resides. The separation of these several parts of the root I effected with the greatest possible care.

Chemical composition.—I digested for seven days, ʒij. of the powdered root in ʒijj. of sulphuric ether; this was then passed through bibulous paper, which on the addition of rectified alcohol, (carefully prepared by myself,) gave a precipitate. ʒis. of the root, which had been digested for the same period in ʒijj. of rectified alcohol, assumed, on the addition of

distilled water, a lacteous turbidness.—3ij. of the root which had been permitted to digest for four days in distilled water, after being filtered, exhibited, on the addition of rectified alcohol, a turbid aspect. From these results the chemical composition of this root may be inferred to consist of caoutchouc, resin, and mucous. This examination was made in imitation of that instituted by Professor Bigelow, and with effects produced by the concurrence of the same coöperating causes, perfectly analogous to those which were accomplished in his hands.

Incompatible substances.—Kino exhibited in combination with the corollata, interferes so much with its medicinal operation as to render it perfectly inert; while the kino itself undergoes such a change in its remedial powers, as a consequence of its consociation with the corollata, as entirely to alter the character upon which its astringency depends. Catechu produces the same effect, and the same interchange of reciprocal action occurs. From this circumstance I am led to the conclusion, that all astringent vegetable substances are at variance with the therapeutic operation of the corollata. In two instances I took twenty grains of the powdered root out of a phial, containing the article sufficiently active to excite *emesis*, in combination with six grains of powdered kino, and no sensible effect of the corollata was experienced, or did the kino display the least perceptible astringent operation in altering the period at which I usually have a dejection, that is, about half an hour after breakfast every morning. Nine grains of the catechu, with twenty-five of the corollata was attended with exactly consimilar results. Opium given in conjunction with it, interferes only with its emetic operation, and it should not therefore be given in combination when the object of the practitioner is to produce *emesis*. Acetic acid interrupted its ordinary operation in two instances, (and the only two cases in which I tried the experiment on myself,) by causing it to pass off by the bowels.

Pharmaceutic preparations.—The vin. Euphorbiæ corollatæ, and the pulvis corollatæ compositus. The former preparation I have made in the following way:—℞. Radicis Euphor-

biæ corollatæ, \mathfrak{z} i.; vini albi hispanæ, octarius unus. dosis \mathfrak{z} ij. ad \mathfrak{z} ss.; emesis provocandi. The latter formula is in imitation of the pulvis ipecacuanhæ compositus, and does not differ in the proportions, except in substituting the corollata in the place of the ipecacuanha. Both of these preparations are as prompt and effectual as remedial agents.

Medical uses.—This vegetable is emetic, diaphoretic, expectorant, and epispastic. As an emetic it is mild and certain in its operation, rarely occasioning pain or spasms, and exciting little previous nausea or giddiness; possessing an advantage over some other remedies of this class, that when it does not prove emetic, it passes off by the bowels. The dose of the powdered root that is required to excite emesis, is from fifteen to twenty grains. This substance is better calculated to effect certain indications, than the more nauseating articles belonging to this class of remedies; and as the judicious practitioner, in the selection of an emetic, will always be guided by the nature of the indication which he intends to fulfil, if his object be to evacuate the stomach quickly and completely, he will avoid those emetics that are distinguished by their nauseating tendency, as in cases of disease which depend on a disordered state of the stomach, in connexion with undue distention, and the presence of acrid and indigestible matter: if, on the other hand, his intention be to influence some remote organ through the sympathetic powers of the stomach, an emetic of an opposite tendency may be better calculated to answer such indications, inasmuch as the nausea which they induce, greatly lessens the force of the circulation; and as the energy of absorption is generally in an increase ratio to that of the circulation, we frequently obtain from nauseating emetics considerable assistance in the treatment of different dropsical affections. The corollata is only calculated to effect the indications which are accomplished by the primary operation of emetics, for whenever our object is to evacuate the stomach, and prevent absorption, we must take care to cut short the nauseating stage, (by such articles as produce little or none of this effect,) a precaution which is highly important in the management of cases in which poisonous substances have

been taken into the stomach. When it is administered with the view of procuring its diaphoretic operation, the quantity exhibited at each dose should not exceed four grains, and this proportion should be given every three hours. The pulvis corollatæ compositus may very frequently be used, particularly when a stimulant diaphoretic is indicated; for from the operation of this compound remedial agent, it would seem that whilst the opium increases the force of the circulation, the corollata relaxes the exhalant vessels, and consequently induces a copious diaphoresis. The dose of this combination is the same as that of the Dover's powder. The expectorant operation of this plant may be procured in the dose of three grains, occasionally exhibited in a little honey, sugar and water, or any other suitable vehicle. In relation to its epispastic property, I would remark, that it possesses an advantage over the ointment prepared with the antimonium tartarizatum, in producing a beautiful display of postules in twelve or fifteen hours after its application, which passes off in two or three days, without occasioning the least inconvenience whatever to the patient. The root in its recent state is merely to be applied contused to any part of the body, and permitted to remain a few minutes only, when a sufficient quantity of the lactescent matter will remain to produce the intended effect. A continuation of the pustular eruption may be kept up, by making an application of the contused root every forty-eight hours.—*Am. Jour. of the Med. Sciences.*

MISCELLANY.

Poppy Oil.—Mr. Allen states that the Poppy is extensively cultivated, in some parts of France, for the sole object of procuring the fine seed, to be crushed for the purpose of expressing the oil. This oil is limpid, and at the same time destitute of any flavour, being insipid and tasteless. It is sometimes used as a substitute for the olive oil, but more generally mixed with it, to adulterate the more costly oil with a cheaper one. Considerable quantities of poppy oil are shipped to the south of France, and even to Italy, to be mixed there with olive oil, and parcels of it are sent to France, from whence it is shipped to the United States, where a pipe of poppy oil is rarely entered at the custom house.

Practical Tourist, 2. page 161.

Supposed Artificial Malic Acid.—M. Guerin observes that Scheeler obtained a peculiar acid, which he called malic acid, by the action of nitric acid upon mucilage. Fourcroy and Vanquelin repeated these experiments, and described a new uncrystallizable acid, which they considered as identical with the malic acid of fruits, this acid not having then been obtained in a crystalline state.

In order to prepare this artificial malic acid, M. Guerin employed the following process:—one pound of gum arabic was treated with two parts of nitric acid, diluted with half its weight of water; the mixture was heated moderately until all the gum was dissolved, and the solution was then slowly boiled for two hours. After dilution with water, it was neutralized with ammonia; muriate of lime was then added to precipitate the oxalic acid formed, and the whole was thrown on a filter; the filtered liquor was yellowish red, and a solution of nitrate of lead was added to it; a yellowish precipitate was obtained, which, after being well washed, was decomposed by a current of sulphuretted hydrogen, and the acid liquor was evaporated with a gentle heat; this was again saturated with ammonia, and decomposed by nitrate of lead; and the precipitate decomposed by sulphuretted hydrogen, gave an acid liquor, which, though evaporated to the consistence of a syrup, gave no crystals.

The properties of this acid are—that it is slightly yellow, reddens litmus, its taste resembles that of malic acid, is inodorous, and more dense

than water. It is very soluble, both in water and in alcohol; it causes precipitation in lime, barytes, and strontia water, which is redissolved by excess of acid. The salts of lead give a bulky precipitate with it, which is insoluble in cold water, and in excess of the acid; boiling water dissolves a small portion, which crystallizes as the solution cools. When this acid is neutralized by ammonia, and heated, an acid salt is formed, which crystallizes in colourless prisms with a rectangular base. Its taste is slightly acid; cold water dissolves it sparingly, but boiling water readily. It is insoluble in alcohol. This acid may be obtained by heating one part of sugar or starch with half a part of nitric acid, in the same manner as already described with gum. M. Guerin concludes that this acid is not the malic, as has generally been supposed, but that it is a new acid perfectly distinct from all others.

Ann. de Chim. xlix. and Phil. Mag. Mar. 1833.

Cure for the Toothache.—Etmuller states that the juice of the root of the *Iris lutea* will cure the toothache, either by being rubbed on the gums, or chewed. It acts, in all probability, by its stimulating properties.

Johnson's Flora.

Mucic Acid.—M. Guerin remarks that gum and sugar of milk are the only substances which, by being heated with nitric acid, yield mucic and oxalic acids; and he thought it desirable to ascertain which of them yielded the most. Water, at 65° dissolved 10.91 per cent. of sugar of milk, and at 212°, 96.70 per cent.; 100 parts of it heated with 600 parts of nitric acid gave as a maximum product 28.62 of mucic acid, mixed with oxalic acid; gum Senegal, which consists of arabin and water, gave only 16.70 per cent. of mucic acid mixed with oxalic; but then sugar of milk contains less than one per cent. of water, while gum Senegal contains 16.1 per cent. and 2.78 per cent. more of ashes. Mucic acid, obtained either from sugar of milk or gum, when dissolved in boiling water, crystallizes on cooling in small scales, which present on their edges small crystals, which appeared to be prisms with a rectangular base.

Phil. Mag. March, 1833.

Chemical Agency of Water.—According to M. Pelouze, anhydrous alcohol, sulphuric ether, and acetic ether, disguise, more or less completely, the properties of the strongest acids. Their solution does not redden litmus, nor decompose a great number of carbonates. A mixture of about 6 parts of absolute alcohol, and one part of concentrated sulphuric acid does not act upon any neutral carbonate, but it immediately decomposes acetate of potash, and disengages abundant vapours of vinegar mixed with acetic ether.

It is well known, since the labours of Fennell and Serullas, that sulphovinic acid is formed in the cold, in a mixture of alcohol and concen-

trated sulphuric acid, but whatever may be the excess of alcohol employed, free sulphuric acid remains in the mixture. It is therefore reasonable to conclude, from the above mentioned experiment, that an alcoholic solution of sulphovinic and sulphuric acid is incapable of decomposing a carbonate; water must be added that the action may occur. A solution of muriatic acid gas in alcohol, so concentrated that when diluted with several hundred times its volume of water it reddens litmus paper, attacks artificial carbonate of lime, and even marble itself with extreme violence. It also attacks, but less strongly, the carbonate of barytes, strontia, magnesia and soda, even when they have been previously calcined, but on the contrary it does not decompose carbonate of potash. Concentrated nitric acid mixed with alcohol does not decompose carbonate of potash; it acts energetically upon the carbonates of lime and strontia; those of barytes, magnesia, and soda are also attacked, but much more slowly.

Vegetable acids produce similar effects; the tartaric, paratartaric, citric, and oxalic acids all dissolve in notable quantity in alcohol; the solution of the two first, did not act upon any of the numerous carbonates with which it was placed in contact. The alcoholic solution of citric acid does not act upon the carbonate of strontia, lime, or barytes, but it attacks the carbonates of potash and magnesia, but the latter with extreme slowness. Oxalic acid which disengages carbonic acid from the carbonates of strontia, magnesia and barytes, does not act at all upon carbonate of potash or of lime. These facts show, that on many occasions in which alcohol is employed in chemical investigations, it will prevent the operator from discovering the presence of an excess of acid by litmus paper.

Mr. Pelouze remarks that some of the facts cited may be satisfactorily explained, whilst others are quite inexplicable. What is the reason, for example, why concentrated acetic acid does not act upon carbonate of lime, while it combines so energetically with caustic lime? why is water required in the first case, and useless in the second?—for in both cases, the same product is obtained. Thus acetic acid dissolved in alcohol, and acetic acid dissolved in water, may be considered, with relation to certain bodies, chalk for example, as acids entirely distinct from each other. Acetic acid dissolved in alcohol is to the carbonates, what carbonic acid is to the acetates dissolved in alcohol; that is to say, in one case there is no action, and in the other, it is strong. Chloride of strontium, chloride of copper, and nitrate of copper, when dissolved in alcohol, were not decomposed by exposure to a long continued stream of carbonic acid gas.

The presence of water does not appear to be always necessary to chemical action; in many cases it may occur with other solvents. Oxalic acid, dried under the receiver of the air pump and dissolved in absolute alcohol, precipitates a similar solution of nitrate. *Ann. de Chim.* t. 1.

Secale cornutum.—This article, it is known, deteriorates greatly by keeping it in a state of powder; the plan of drying it thoroughly, before pulverizing it, also dissipates much of its powers. A writer in the London Medical and Surgical Journal states that the best plan is to preserve it in covered vessels, in substance, and to reduce it to powder, when wanted, by means of a common coffee mill.

Chloride of Gold and Sodium.—Dissolve 96 grains of pure gold in a sufficient quantity of nitro-muriatic acid, evaporate and crystallize; dissolve the crystals in distilled water and add 30 grains of precipitated chloride of sodium. Evaporate and crystallize. This salt is slightly deliquescent, and should therefore be kept in a glass stoppered vial.

Lond. Med. and Sur. Jour.

Method of Cutting Glass Vessels without Cracking.—Fill the vessel with oil to the place where it is intended to be cut. Immerse a red hot iron to an inch below this line; the heat will produce combustion, with evaporation, which will cut the vessel around at the surface of the oil. Otherwise—mark with a file, the glass, around the place it is to be divided, dip a string in spirits of turpentine, tie it round this mark, and then set it on fire, and the glass will crack along the line marked.

Jour. de Con. Usuel. and Silliman's Journal.

Lute for Bottling Wine, Tinctures &c.—One part rosin, one-fourth part yellow wax, one-sixteenth part tallow; add one-half part yellow ochre, or red or black ochre or coal. Keep these ingredients melted over a chafing dish, and when the bottle is well corked, dip the neck into the melted mass.

Idem.

Watered (moire) Brass.—Brass ornaments, boiled in a solution of sulphate of copper, becomes watered, in the same manner as tin plates from the effect of an acid. One piece tried was peculiarly striking, having spangles resembling opal, united with a deep coloured ground formed of finer reddish crystals. Certain brasses assume the appearance of porphyry, others of granite, of various shades, according to the proportions of zinc or copper contained in them. In some cases the brass becomes of a dark colour, without reflections; but a slight friction and a little varnish will give the desired appearance. A few iron nails left in the solution will quicken the operation. The solution should be strong.

Journ. de Connais Usuel.

Antidote to certain Poisons.—The fruit of the *Feuillea cordifolia*, a native of South America, has been ascertained to be a powerful antidote against vegetable poisons. Mr. E. Drapiez poisoned dogs with the *Rhus toxicodendron*, hemlock and *Nux vomica*. All those that had not the anti-

dote administered, died, whilst in cases where the Fueillea was given, the animals recovered. *Murat & Delens Dict. Univer. Mat. Med. t. 3.*

Hydrocyanic Acid.—A species of *Ipomæa*, the *I. dissecta* abounds in hydrocyanic acid to that degree, that Dr. Nicholson of Antigua, informed Dr. Hooker, that “if this medicine shall be found deserving of the high character which some physicians have bestowed upon it, the *I. dissecta* may become valuable in a country where the prussic acid cannot be preserved many days in a pure state.” *Botan. Mag. Mar. 1832.*

Otaheitian Arrow Root.—This is prepared from the root of the *Tacea pinnatifida*, which grows in great abundance in Otaheite and other islands in the Pacific. The root is round, white, smooth, and from two to three inches in diameter. When a sufficient number of the roots are collected, they are taken to a running stream, or to the sea side, and washed; the outer skin is carefully scraped off, and the root is then reduced to a pulp, by means of a rasp, made by winding twine of cocoa nut husk, round a board. The pulp, when prepared, is washed first with sea water, through a seive made of the fibrous web, which covers the ground formed of the cocoa nut palm; and the starch or arrow root, being carried through with the water, is received into a wooden trough. This fecula is allowed to settle for a few days, the water is then strained, or more properly, poured off, and the sediment again washed in fresh water; this is repeated three times, after which the fecula is made into balls of seven or eight inches in diameter, and dried in the sun; after they are dry, they are pounded and the powder is spread in the sun for some hours, after which it is carefully wrapped up, placed in baskets, and kept for use. It can be procured at from 1½d. to 2d. sterling, (3 to 5 cents,) a pound. Its quality is excellent. *Gardeners' Mag. 1832.*

Pate de Guimaue.—M. Cules, of Paris, gives the following formula as the best:

R. White contused gum arabic,	lb. ij ℥iv
White sugar,	lb. ij
White of eggs,	No. xx.
Double orange flower,	℥vi

Dissolve in the cold, or by a gentle heat, the gum and sugar in a sufficient quantity of water, stirring it well. Pass the solution through a linen cloth, and next day gently decant it into an evaporating dish, so as to leave the fine sand which had passed with the solution; evaporate without boiling, constantly stirring, to the consistence of clear honey; add at two operations, the whites of eggs, and stir briskly; continue the evaporation, taking care that the mixture does not burn; when almost done, add the orange flower water, and continue to stir, till the mixture will no longer

adhere to the hand, then pour the whole on a marble, dusted with starch, and keep in a tin box.

Journ. de Pharm. Nov. 1832.

Febrifuge Powers of the Holly.—The leaves of the holly have been indicated by Dr. Rousseau as febrifuge. The infusion or the powder has been used with success. But, it is more advantageous to employ the ilicine or active and bitter principle of the holly. This substance, which is deliquescent, uncrystallizable, and doubtless impure, is obtained, according to M. Deleschamps, by dissolving the alcoholic extract of the leaves of the holly, in water, and in successively treating it with the subacetate of lead, sulphuric acid, and carbonate of lime. The filtered and evaporated product is then to be dissolved in alcohol, the mixture filtered and evaporated in shallow vessels.

Two pounds of the fresh leaves lose, by drying, 1 lb. 4 ounces, and afford 3 ounces, 3 drachms, 48 grains (French weight,) of dry extract. Two pounds of dry leaves afford 5 ounces, 3 drachms, 24 grains of dry extract, or of ilicine 1 ounce, 7 drachms, 18 grains.

Journ. de Pharm. Dec. 1833.

New Substance from Sarsparilla.—M. Thubeuf has obtained a new substance from sarsparilla, by means of alcohol. It is white and tasteless, when pure, soluble in alcohol and water, communicating to the latter the saponaceous property which is remarked in decoctions and infusions of sarsparilla; it crystallizes in an aggregated form; thrown on burning coals it gives out a smell somewhat like that of benzoin. Ten pounds of sarsparilla afforded 3 oz. 1 dr. of this substance in an impure form. *Ib.*

Instantaneous Vesication.—M. Pigeux proposes the following plan:—A piece of linen, cloth, or even paper, is cut to the size of the vesication that is wished; this is to be dipped into alcohol at 26° or 30°, or even into eau de Cologne or good brandy, and drained so as not to permit any of the liquid to spread; it is then to be placed on the skin, and set on fire. The flame lasts but a few seconds, and the epidermis may be readily removed. To prevent any possibility of the flame extending beyond the proper limits, the vesicatory is to be surrounded by a compress wetted with water. *Ibid.*

Gonorrhœa.—M. Ouerin de Marmers states that he has found the following to be exceedingly efficacious in the secondary stage of Gonorrhœa, or after the inflammatory stage has been removed by bleeding, diet &c.

R. Balsam copaiba,		Infus. pip. cubeb.	℥ss
Syrup diacodium,	a a ℥i	Ol. anis.	gtts iij
Pulv. gum arabic	3ijj	Coc. cacti.	gr. ij
Aqua cinnam.	℥iss		

The dose of this mixture is two table spoonfulls a day, one in the morning, the other at night. *Ibid.*

Medical History.—The medical properties of the *Collinsonia* did not escape the notice of Shoepf, who states that it had been found useful in a variety of diseases. It, however, attracted but little attention from the physician, though it always maintained its ground as a domestic remedy of great efficacy, among the inhabitants of certain districts of country.

The fullest treatise on it we have met with is by Dr. Charles Hooker, of New Haven. This gentleman appears to have experimented with it on a tolerably large scale, and we shall freely avail ourselves of his labours in a subsequent part of this paper.

Hydriodate of Potassa.—In a lecture before the Medico-Botanical Society, Mr. Everett stated that the hydriodate of potassa of commerce was generally adulterated. He stated the best plan for procuring it was as follows: pour eight ounces of distilled water into a phial, and add to it 500 grains of iodine, and 200 grains of polished iron wire, cut into small pieces.—The mixture is to stand for three or four days, when it will assume a dark greenish colour; it is then to be filtered, and 428 grains of bicarbonate of potassa added.

Lond. Med. and Surg. Journ. Jan. 1833.

New species of Opium.—Dr. Epps, in one of his lectures, gave an account of a new species of opium, which may be denominated the *Persian*. It is in small cylindrical pieces, rolled up in polished paper. On removing the covering, the drug appears of a reddish brown colour, but much lighter than the Turkey opium. It has a very fœtid, heavy smell, and a bitter acrid taste.

Ibid.

New principle in Opium.—M. Robiquet has announced the discovery of another new principle in opium, to which he has given the name of *pavérine*, which is soluble in water. It is highly azoted, saturates acids, and does not dissolve in potassa. It is poisonous, and acts in a very marked manner on the spinal marrow.

Journ. de Pharm. Nov. 1832.

Delphine, Veratrine, and Solanine.—Mr. O. Henry, gives the following mode of preparing these alkaloids. To extract *delphine* he takes a certain quantity of the seeds of the stavesacre (*Delphinium staphysagria*,) in powder, treats by a gentle heat, several times, with alcohol at 32°, with the addition of a small quantity of sulphuric acid (20 to 30 grammes to each kilogramme of the seed;) the alcohol being decanted and expressed from the marc, a sensible excess of finely powdered slacked lime is to be added—this produces a flocculent precipitate of a yellow or greenish colour, and the alcohol also assumes a yellowish tint. This last being carefully filtered and distilled, leaves a greasy, greenish substance, almost insoluble in water, and which may be deprived of all the yellow colouring matter, by washing with tepid water. It is then to be treated with distilled sulphuric acid, and filtered whilst hot, for on cooling it often assumes a gelatinous appearance. This clear, amber coloured liquid, on the addition of

a slight excess of ammonia, affords a flocculent white precipitate, which is to be washed, and dissolved in alcohol at 35°. On evaporating the alcohol, a resinoid residue is obtained, which is the *delphine*, which will become friable and pulverizeable on being exposed to a moist atmosphere, or by being moistened with water.

Veratrine is readily procured from the seeds of the *Veratrum sabadilla*, by the same process; and in acting in the same way on the stems of the *Solanum dulcamara*, an alkaloid can be obtained, which Mr. Henry thinks is identical with solanine.

Journ. de Pharm. Dec. 1832.

Chlorate of Potassa.—M. Ganassini, of Verona, gives the following process: Take a pound of chloride of calcium in a concentrated solution, and dissolve in it an ounce and a half of hydrochlorate of potassa in crystals. Let the mixture stand for a few days. Afterwards evaporate and concentrate the liquid, and on cooling, crystals of chlorate of potassa will be obtained, amounting to about ten drachms.

Ibid. Jan. 1832.

Root of the Elder in Dropsy.—M. Martin Solon has been very successful in the removal of dropsical effusions, by the administration of the juice of the root of the elder. This remedy is prepared as follows: the roots are washed, and deprived of their epidermis by rubbing them with a coarse cloth, and the cortical portion then rasped off, pounded in a mortar, exposed to strong pressure, and the juice filtered. This juice is of a reddish brown colour, transparent, of an insipid, rather nauseous smell, and of a sweetish taste. It is to be taken in the dose of two ounces in the morning.

Journ. de Pharm. Dec. 1832.

Camphor of Borneo.—It has long been known that there has been in the island of Borneo, a particular genus of tree, which, to use the quaint language of Kämpfer, *is not of the blood of daphne*, that is, it does not belong to the laurels, although it affords camphor. It also occurs at Sumatra. (Kämpfer's *Amœn. exot.* p. 773.) Grimm also noticed, in 1683, in the *Ephem. Nat. Cur. Dec. 2. Obs.* 163. p. 371. Finally, Fouttuyn, in *Verhandelng maastch.* No. 21, p. 266, proved it should not be confounded with the camphor laurel. The best description of the camphor tree of Borneo has been given by Colebrooke, in *Asiatic Researches*, vol. 12. p. 540. He gives the figure of it under the name of *Dipterocarpus*, from the fruit having two wings, like those of the seed of the maple. The *Dryobalonops camphora* of Sumatra, Colebrooke, is the *Pterygium teres*, Correa. *Annal. Museum*, 10. p. 159. The *Shorea robusta*, Roxburgh, which is also regarded as a camphor tree, affords an odorous resin, which is used instead of incense in the pagodas of India.

Ibid.

Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Dance, Van Dine & Co. N. Y. - Boston

Printer: Wallace & Co. N. Y.

CHENOPODIUM ANTHELMINTICUM.
(Jerusalem Oak)



Fig. 1.

CLETHRA ALBA

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ORIGINAL COMMUNICATIONS.

ART. XXXI.—On *Chenopodium anthelminticum*.

By R. EGGLESFELD GRIFFITH, M. D.

Nat. Ord. CHENOPODEÆ.

Sex. Syst. PENTANDRIA DIGYNIA.

CHENOPODIUM. *Calyx*, five-parted, with five angles. *Corolla*, none. *Style*, bifid, (rarely trifid.) *Seed* one, lenticular, horizontal, covered by the closing calyx.—*Nuttall*.

C. anthelminticum. *Leaves* oblong-lanceolate, sinuate and dentate, rugose. *Racemes* naked. *Style* one, three-cleft.—*Elliot*.

Synon. *Botrys prealta frutescens*. Clayt. Virg. 145. Gron. Virg. No. 39.

Chenopodium lycopi-folio, perenni. Dill. Hort. Eltham. 77.

Chenopodium anthelminticum. Lin. Sp. Pl. 320. Willen. Sp.

Pl. 1304. Pursh. Fl. Am. Sep. 1. p. 198, &c. &c. &c.

Icon. Dillen. Hort. Eltham. t. 66. f. 76. Barton, Mat. Med. U. S. 2. t.

44. Rafinesque, Med. Flor. 1. t. 21.

Common Names. Jerusalem oak. Wormseed. Wormseed Goosefoot.

Stinkweed &c.

Pharm. Name. Chenopodium. U. S.

Officinal, Seeds. Small, irregularly spherical, dull greenish yellow or brownish, with a bitterish somewhat aromatic pungent taste, and peculiar, unpleasant smell.

Description.—Root perennial and branched. Stem upright, herbaceous, much branched, deeply grooved, about two to four feet high. Branches fastigiate, giving the plant a shrubby appearance. Leaves sessile, alternate and scattered, at-

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A

tenuate at each end, with very strongly marked nervures, oval or oblong, deeply sinuate, or dentate, studded beneath with small globular, oleaginous dots. Flowers very small, numerous, of a yellowish green colour, and collected in long axillary, dense, leafless spikes. Calyx monophyllous, with five short oval segments. Corolla none. Styles bifid and sometimes trifid, filiform, longer than the stamina. Stamina opposite to the segments, exserted. Seed small, lenticular, shining, of a dirty yellow or brownish colour, covered by the persistent calyx.

Habitat. This species of *Chenopodium* is found in most parts of the United States, from New England to Florida, and is most abundant and of a larger size to the south. It grows in old fields, along fences by road sides, and in fact in all neglected situations, which have been cleared of trees and underwood for any length of time; it is never met with in woods or on mountains. It also grows freely in France and other parts of Europe, having become almost naturalized in some situations.

It begins to flower about the latter part of June, or beginning of July, and continues in inflorescence until September, or even later. The seeds may be gathered from August to the middle of October. It is sometimes, though not commonly cultivated, as the wild plants occur in sufficient abundance to supply the demand for it as a therapeutic agent.

Botanical History.—The generic name is derived from two Greek words, signifying goose foot, from a fancied resemblance between the leaves of some of the species, to the web foot of that bird. None of the species possess any beauty, and are most generally inert; all the inodorous kinds may be eaten, and form a good substitute for spinage, sometimes, however, acting gently on the bowels. The maritime species are used for making soda, whilst almost all the odorous kinds are possessed of important medical properties.

The species under consideration was classed with several others of an analogous character, under the now obsolete genus *Botrys*, by the earlier writers on botany, and they, in fact present so many striking peculiarities in their physical and

therapeutical properties, that they might with propriety form a subgenus under that appellation.

Rafinesque is of opinion, that two distinct species are confounded under the name of *anthelminticum*; he has, therefore, given the title of *rugosum*, to that found in the southern and western states. In this we think that he has gone too far, and that he has erected a mere variety, depending on soil and climate, into a species, without sufficient ground for so doing; at all events, if *rugosum* be admitted as a legitimate species, its habitat must be considerably extended, as specimens answering in every respect to Elliott's description, to which he refers, are by no means uncommon in certain localities in New Jersey.

Pursh observes that the *anthelminticum* "grows plentifully in the streets of Philadelphia." This is denied by Dr. W. P. C. Barton, who states that this botanist must have observed carelessly, or he would have ascertained that it is the *ambrosiodes* which is so common in the suburbs of the city. From our own observation, it would appear, that although the latter species is certainly the most abundant in these localities, the *anthelminticum* also occurs in sufficient quantity to warrant the remark made by Pursh.

Medical History.—Many species of the genus *Chenopodium* have at different times been employed in medicine to fulfil various indications, and from the concurrent testimony of the earlier writers as respects the therapeutic properties of some of them, it is evident that in this case, as in many others, we have neglected articles of established efficacy, in the mania that exists for new and more powerful drugs. The vermifuge qualities of the plant under consideration appear to have attracted notice soon after the establishment of British colonies in this hemisphere, and more especially in Virginia, where the first trials with it were made, and it is spoken of by Schœpf, Kalm and others, with various degrees of commendation. Its anthelmintic properties are now universally recognized, and it is admitted as a legitimate article of the *materia medica* into the national pharmacopœia, and the various dispensatories.

Medical Properties.—The *C. anthelminticum* is usually classed among the vermifuge remedies, and although it has been advantageously employed as an antispasmodic, no writer on our native materia medica has noticed its powers in this respect, although they are of a much higher order than those of its kindred species, the *ambrosiodes*, which has been so successfully used in chorea, and other deranged states of the nervous system. Plenck gives the result of his experiments with this latter in five or six cases of chorea, which had resisted the usual modes of treatment, in which a complete cure was effected by a decoction of it; its success in this obstinate disease is amply confirmed by subsequent writers, and we have every reason to believe that still more important results would attend the employment of the *anthelminticum*, under similar circumstances.

Pharm. Preparations, and Mode of Administration.—As an anthelmintic, it is given in a variety of forms, as the expressed juice of the whole plant, an electuary of the seeds, a decoction of the leaves in milk, the essential oil extracted from the seeds, and even in tincture.

Although there can be no doubt of the value and efficiency of these preparations, they are not employed at the present day as generally as *Spigelia*, and other articles of the vermifuge class; this, in all probability, is owing to the nauseous taste inherent to every preparation that can be made, rendering it exceedingly difficult to induce children to swallow a second dose.

When the expressed juice is employed, it should be prepared from the fresh plant, as near the time at which it is to be administered as possible, as it loses much of its efficacy by keeping. The dose is a table spoonful on an empty stomach, morning and evening; to be repeated till the desired result is obtained. The decoction in milk is made by boiling a handful of the leaves in new milk; the dose of this is about a wine-glass full, taken in the same manner as the expressed juice. When used in the form of an electuary, the seeds are to be pulverized and well mixed with honey or molasses; this is the most objectionable form in which the remedy is adminis-

tered, as the quantity of seed required to act on the worms is so great as to produce nausea in many cases.

The best form is, indisputably, the essential oil, as whilst it possesses the advantage of containing the active properties of the plant in the smallest possible compass, it at the same time is not more offensive to the palate or stomach than the other preparations. This oil is generally obtained from the seeds by distilling in a water-bath; but we have every reason to believe that it would be more advantageous to use the whole plant for this purpose, as the leaves contain full as much of the volatile oil as the seeds. When pure, it is of a light straw colour, possessing the peculiar odour of the plant in an eminent degree, and is very pungent and even acrid to the taste. As met with in commerce, it is often adulterated with oil of turpentine, or some other essential oil.

The dose for a child of two years of age, is from five to ten drops, three times a day, increasing the quantity in proportion to the years. The best mode of giving it, is to drop the oil on a lump of sugar, which is then to be grated into as much water as it will render highly pungent; taking care with very young children not to make the dose too stimulating. It should always be administered on an empty stomach, and after half a drachm to a drachm has been taken, the child is to be gently purged with castor oil or calomel.

As regards the tincture, we know but little. Kalm, however, states that it was the favourite mode of exhibiting it in some parts of the country, and that the results were highly satisfactory.

ART. XXXII.—*On the Metals known to the Aborigines of N. America.* By JACOB GREEN, M. D. *Professor of Chemistry in Jefferson Medical College.*

THE following particulars, respecting certain metallic substances discovered in the ancient graves of our aborigines, have been collected together, with a hope that they may throw an additional ray of light on the dark history of that mysterious race, which once inhabited along the banks of our great western rivers.

It is commonly supposed that those nations who obtained their sustenance by agriculture, were the first to devote much attention to the mechanic arts, and that they were therefore the first to discover the processes of metallurgy. Those who wander from place to place and live by hunting and fishing, might readily substitute for metals, sharpened flints and shells, thorns, and the bones of fish and other animals. Whether the people who constructed the fortifications and mounds of the west, had already passed, in the usual order of civilization, from the hunting to the pastoral state of society, or were just abandoning the pursuits of the chase for the employments of agriculture, are points foreign to this communication; its object, as just stated, being merely to show that they were acquainted with some rude processes of metallurgy.

According to all antiquity, sacred and profane; gold, silver and copper, were the first metals used by man. These facts are exactly what our present knowledge of mineralogy would lead us to expect—for we even now find these metals so pure in nature, that there is no necessity of resorting to melting and refining furnaces in order to render them malleable. We know nothing with certainty of the methods resorted to by the ancient metallurgists, but we have always supposed that the metals used in the first ages of the world were derived from the native substance, accidentally discovered near the surface of the ground, and not by extraction from the ores.

There are several instances mentioned in which small ornaments of *gold* have been found in our ancient tombs. The

following fact will be sufficient for our purpose. Dr. Hildreth, in the *Archæologia Americana*, informs us that in a mound in Ross county, near Chillicothe, a piece of gold was discovered lying in the palm of a skeleton's hand.

The quantity of native gold now obtained from several districts of the United States, renders it highly probable that this metal was not uncommon among the Aborigines. Plates of native gold, beaten out into thin foil, are frequently attached to the mummies in the tombs of the ancient inhabitants of Mexico. These plates are a native alloy of gold and silver, the silver being in such excess as to obscure the lustre of the gold altogether. On analyzing one of these plates, now in the Philadelphia Museum, I found it about fifteen carats fine—no copper could be detected in the alloy. This is the kind of gold, I suppose, known to the ancient North Americans.

The next metal to be noticed is silver. Near the mouth of the Muskingum, there are a number of old fortifications. Among the many curious articles found on digging in that place, there were several pieces of silver. This silver had been hammered out into thin plates, one of which was six inches long and two inches broad. It weighed one ounce. I might notice several other instances in which silver has been discovered in our tumuli. In all these cases the metal was no doubt in its native state. Large masses of silver are now met with in Mexico, and smaller portions frequently occur in some of the northern states.

Our third substance is copper. It is known to almost every one, that no metal was more common in ancient times than copper. It often occurs in loose, insulated masses. Not far from Lake Superior there is a large mass of this kind, weighing more than 2000 pounds, from which I have seen some rude utensils and ornaments fabricated by our present race of Indians. Near Somerville, in New Jersey, a lump of native copper, of about 100 pounds weight, was ploughed up a few years since, and I have some specimens obtained from that rich locality, weighing nearly two pounds. From these and other instances which could be specified, it might be expected

that copper would often occur in our ancient mounds. Two or three examples, however, will be sufficient.

Dr. Drake, in his picture of Cincinnati, while noticing the articles dug from the ancient works in the Miami country, enumerates among them "a handful of copper beads, a small oval piece of sheet copper with two perforations, a large oblong piece of the same metal, with longitudinal grooves and ridges. Several copper articles, each consisting of two sets of circular concavo-convex plates." Dr. Hildreth of Marietta, has given us an account of some curious ornaments of copper, taken from the ancient works near that place. The skeleton with which the copper was found, had entirely mouldered away, except a portion of the forehead and skull, which were in contact with the copper: "These bones were deeply tinged with green, and appear to have been preserved by the salts of copper." In the Philadelphia Museum, I have examined a rod of copper, dug out of a mound on the St. Johns river, by Mr. Peale and others; it is about twelve inches in length, is pointed at the ends, and seems much harder than pure copper. When copper supplied the place of iron, the Egyptians had a process of rendering it exceedingly hard. It is also well known that the Peruvians and Mexicans tempered their axes and instruments of war, which were all of this metal, so as to make them a good substitute for iron; and from the appearance of the copper rod found by Mr. Peale, I have no doubt that our Aborigines were acquainted with the same art. That they possessed considerable skill in moulding and working copper is evident, not only from their beads, rings, arrow-heads, and pipes, some of which are said to have been *soldered*, but ornaments of this metal have been found overlaid or plated with silver. These operations certainly imply very considerable advancement in the art of metallurgy. See Atwater's *Antiquities &c.* p. 168.

Besides gold, silver and copper, our Aborigines were also acquainted, in some degree, with iron and lead. Every one knows that the art of working iron is more difficult, and of a later date, than that of the other metals just mentioned. It was, however, of very remote antiquity, though it was con-

finer to particular places. Even as late as the Trojan war, so high a value was set upon it, that a ball of iron was one of the prizes offered by Achilles at the funeral ceremonies in honour of Patroclus. Native iron is not very uncommon, and is usually more malleable and tenacious than the forged metal. The iron mentioned by most ancient writers, and that found in our ancient graves was no doubt the native mineral. In the cabinet of the New York Lyceum, I lately examined a large mass of native iron from Red River, in Louisiana. Its weight exceeds 3000 pounds, it can be easily cut, and is very malleable. At a red heat, fragments of it might readily be beaten into knives and spear heads.

The occurrence of iron in our mounds, manufactured into various utensils, cannot be doubted. Dr. Hildreth states "that a piece of iron ore, which has the appearance of being partially melted, or vitrified, was found in the ancient works on the Muskingum, and that this ore was about the specific gravity of pure iron." It must therefore have been native iron. Mr. Atwater, in the *Archæologia Americana*, mentions several instances in which fragments of iron blades have been found almost wholly converted into oxide. Those ferruginous balls sometimes discovered in the mounds, have been strangely supposed by many to have been cannon balls of iron; but they are merely globular masses of pyrites, or the deuto-sulphuret. They often occur in the alluvial earth, in the western states. I have seen these balls more than a foot in diameter, and so perfectly spherical as to appear very much like the works of art.

The last metal to be noticed is lead. The lead ores of Missouri are so exceedingly rich and abundant, that the vast commercial demands for this metal, might there be supplied for some thousands of years. Though native lead is of very rare occurrence, and is perhaps only found in volcanic regions, there is no ore more readily reduced; indeed, this operation is now constantly performed by the Indians, to obtain balls for their rifles, and for the purpose of ornamenting their tomahawks and pipes. The occurrence of lead, however, in the ruins of our tumuli is not very common. Dr. Drake, in de-

scribing the articles taken from a mound in the city of Cincinnati, mentions "a mass of lead ore," and further remarks that "lumps of lead ore, or galena, have been found in other tumuli." A similar statement is made by Col. Sargent, in the American Philosophical Transactions, vol. iv. p. 205.

From the above particulars it follows, that although we cannot boast much of the skill of our aborigines, in the refinements of metallurgy, still they were undoubtedly familiar with some of the uses of gold, silver, copper, iron and lead; and possessed vastly more knowledge on these subjects than the barbarous tribes who inhabited the same regions two or three centuries since.

ART. XXXIII.—*Essay on the analysis of Mineral Waters, together with a new analysis of Saratoga Water, with the view of ascertaining not only the acids and bases, but the manner in which they are combined, together with a suggestion of the method of imitating other Mineral Waters from their analysis.* By C. C. C. COHEN.

THE analysis of mineral waters, notwithstanding the vast improvements which have been introduced into analysis generally, has been but little advanced since the time of Klaproth; for although it must be admitted that several new substances have been lately discovered in mineral waters, of which before, the very existence was unknown, yet still the same errors inherent in the processes adopted by the earlier chemists is systematically pursued, without an attempt at amendment, by more modern operators, and consequently the same erroneous results obtained; erroneous, not in reference to the substances themselves, but merely in relation to the manner in which the combinations exist in the natural spring. Hence the difficulty of imitating the contents of a spring by attempting to unite the insoluble combinations always generated by the present mode of analysis, and the little success which has hitherto attended those operators who have endeavoured, by synthesis, to form a factitious water at all resembling the original spring. The design of the present essay is to unfold a new method of

examination, and one which it is presumed will give correct results as to the exact state in which substances are combined in the original spring, thereby rendering it easy to be imitated; an advantage not to be lightly estimated by those who live at a great distance from the natural spring.

The difficulties which have been urged against the synthetic proof of a correct examination of mineral waters, resolve themselves into the incapability of determining by chemical analysis the exact combinations formed by the substances existing in the spring, an incapability often maintained with great justness against those who would wish to deduce from analysis the medicinal virtues of a natural spring. With a view to obviate this objection, Dr. Murray, many years ago, suggested the probability that the elements of a mineral water unite under the form of the most readily soluble salts; a theory strongly objected to by an intelligent correspondent of the *Quarterly Journal of Science*, who maintains that "the results of his [Dr. Murray's] own chemical investigations are far more clearly elucidated in the theory which Berthollet has so ably conceived, and which Professor Berzelius, and probably most other chemists, have now embraced, according to the principles of which a common solution of several salts, and hence a mineral water, contains as many different salts as the product of the number of its bases by the number of its acids." *Quarterly Jour. Science*, Jan. to June, 1828—article on Mineral Waters, by Mr. A. Walker.

The following experiments, made with the sole view of elucidating this fact, will prove that notwithstanding the high authority of those who advocate Berthollet's theory, Dr. Murray's opinion on this subject was correct; a circumstance rather remarkable in a chemical speculation formed prior to the exhibition of any facts to maintain it; and here I may be permitted the remark that it appears very strange that the theory of Dr. Murray should not have suggested a simpler method of analysis in preference to the complex one he adopted, a method which it will not be deemed necessary to enlarge on in this article, although it must be censured as the

most operose system yet suggested for a correct analysis of mineral waters.

The experiments I am about to relate will show the correctness of Dr. Murray's theory beyond the possibility of doubt or cavil.

Experiment 1. A solution of muriate of lime containing about $\frac{1}{100}$ of crystallized salt was dropped into an equivalent quantity of an equally dilute solution of the true bicarbonate of soda; no precipitation occurred.

Experiment 2. The solution was heated, an effervescence took place, and a precipitate of carbonate of lime fell down, the upper solution containing muriate of soda.

Experiment 3. Into the solution of experiment 1, thirty times its bulk of highly rectified alcohol was poured; a bulky precipitate fell down without any effervescence occurring, which on examination was found to be pure bicarbonate of soda, the earthy muriate remaining dissolved in the alcoholic solution. Now, from these experiments it is evident, firstly, that no decomposition of the salts takes place in the first experiment, as previous to a decomposition taking place an effervescence occurs, as is shown in experiments 2 and 3, plainly proving that no carbonate of lime existed at that time in the solution.

To be certain, however, of this fact, and to ascertain whether, if carbonate of lime were dissolved in carbonated water and mixed with a solution of muriate of soda, it would operate in like manner with the above solutions: the results were as follows:—

The carbonate of lime was freshly precipitated from the solution of the muriate of lime, washed, and put in contact with the carbonated water while still moist; it readily dissolved; the equivalent proportion of muriate of soda was added.

On adding but a very small proportion of alcohol, an effervescence ensued, and carbonate of lime was precipitated, plainly proving a difference of combination between this solution and the one before made, although containing the same substances in solution; showing an advantage in the means employed for the analysis of the two solutions not possessed

by the ordinary modes of examination. On repeating these experiments frequently since, I have found temperature to materially modify the action, as also the manner, in which the alcohol is added, in some measure to affect the result, but as this promises to afford some curious facts in its investigation, I may, in some future number of your Journal, present your readers with the results of my researches on this subject; but for the present I wish more particularly to proceed to the examination of Congress water, which is the principal subject of this essay.

The following experiments were made some time since with the view of ascertaining the cause of silicium being dissolved in mineral waters, and the results are not a little surprising. A quantity of silicate of soda was dissolved in a large quantity of water, and carbonic acid passed through to supersaturation; during the transmission of the gas a slight precipitate formed, which, however, was totally redissolved on continuing to pass more of the carbonic acid through it.

A quantity of freshly precipitated silex in a gelatinous state, well washed, was diffused through a solution of supercarbonate of soda, carbonic acid was passed through the mixture, and after some time the clear solution was examined and found to contain a notable proportion of silex.

The compound of silex and carbonate of soda in carbonated water is completely decomposed by alcohol, carbonic acid gas flying off, silex and carbonate of soda precipitated.

Convinced by the above results that an analysis of a mineral water might be effected without having recourse to heat, and in such a manner as would enable the experimenter to ascertain the precise combinations which existed therein, I have attempted the analysis of Congress water with the view of ascertaining whether it be not possible to form an exact imitation of the spring containing the same, in the same proportions and in the same combinations as in the original.

The usual preparatory testing differing in nothing from Dr. Steel's memoir, I pass over it and proceed to the analytic examination. In the quantity of carbonic acid, as stated by Dr. Steel, I conceive an error to exist, although I am precluded

from experimentally proving it to be so, as my analysis has been performed on the bottled water sold by Lynch & Clarke. The error consists in his having boiled the water and collected the gaseous products, instead of endeavouring to separate the carbonic acid by some other means; as by boiling, the bicarbonate of soda would be reacted upon by the earthy muriates, and a quantity of its carbonic acid would be evolved, and of course increase the actual quantity of uncombined carbonic acid.

According to Dr. Henry the quantity of carbonic acid taken up by water at the usual pressure of the atmosphere, is its own bulk, and probably the overplus in Dr. Steel's analysis, may be considered as derived from the decomposition of the bicarbonated soda, and consequently in lieu of 311 cubic inches of uncombined carbonic acid in a gallon of water, it should be estimated as 231; the cubic contents of a gallon. I may have an opportunity of verifying this before long, but cannot at present make any further objections than those which analogy apparently correct, at present suggests to me.

Sixteen troy ounces of congress water were mingled with two gallons of highly rectified alcohol 812 in a glass jar and the mixture well agitated: a brisk effervescence was excited and a bulky flocculent precipitate began to fall, which, on being collected and washed with alcohol and dried at a heat of 100 F. weighed $66\frac{1}{2}$ grains. A.

The clear supernatant liquid to which the washings of A were added, was tested with a solution of nitrate of silver containing one drachm of dry nitrate to the ounce, of which 692 grains were used, corresponding to 86.5 grains of pure nitrate, the precipitate thence ensuing, on being collected, washed and dried, weighed 74 grains. B.

The precipitate B digested in liquor of ammonia C, left one grain of insoluble residuum, which, on examination, was found to be iodide of silver. D.

The solution in liquid ammonia C was supersaturated with nitric acid and a precipitate weighing 73 grains E again produced corresponding to 18 grains chlorine.

To ascertain the presence of bromine, I resolved to try the

effect of boiling it with sulphuric acid ; as that acid is decomposed by bromide of silver into sulphuric acid, of which, in order to ascertain the presence I passed the mixed gases (or muriatic acid gas, from the action of sulphurous acid on the chloride of silver, and sulphurous from the same action on any bromide that might be present,) into a solution of muriate of gold, previously freed from any excess of acid, when a brownish film of metallic gold appeared on the surface of the solution, arising from the action of the sulphurous acid on the solution. I was unable to estimate the exact quantity for want of the requisite convenience, but I should estimate it to equal the quantity of iodine present in the water, and I conceive it exists in the state of hydrobromate of magnesia in the water.

The supernatant liquid of precipitate B was evaporated to dryness, and the residuum strongly ignited, it then weighed $12\frac{1}{2}$ grains.

These $12\frac{1}{2}$ grains were dissolved in muriatic acid added to excess, and ammonia was added to neutralize the excess of muriatic acid, so as to leave a portion of muriate of ammonia in solution. Oxalate of ammonia being now added, a precipitate of oxalate of lime fell, which, on being washed, collected and ignited to redness for half an hour, yielded $6\frac{1}{2}$ grains of pure lime. F.

The solution remaining after the separation of the lime, was precipitated by phosphate of soda and ammonia, and a precipitate accrued, which, on being calcined to redness, weighed $14\frac{3}{4}$ grains, corresponding to rather more than six grains of magnesia. G.

2. The precipitate A was now examined ; it was dissolved in two ounces of distilled water : a slight turbidness was evident, arising from the silex diffused through it. Acetic acid was now added, as long as an effervescence was produced ; the loss of weight due to the disengagement of carbonic acid, was 23 grains. A. The precipitation of the silex now took place. It was very small in quantity, and may be estimated at one tenth of a grain. I did not either collect or weigh it, the quantity being so extremely small.

The liquid was now filtered and a solution of acetate of silver added, as long as a precipitate ensued; the precipitate thence resulting was perfectly soluble in liquid ammonia; it weighed $42\frac{1}{2}$ grains *b*.

This precipitate *b* was boiled with sulphuric acid and the gas passed through a solution of muriate of gold, as in the previous experiment, but no reduction of the gold took place, proving the absence of bromine.

The chlorine of precipitate *b* is $10\frac{1}{2}$ grains, which, added to the carbonic acid *a*, 23 grains, will make $33\frac{1}{2}$ grains which, deducted from the original precipitate A $66\frac{1}{2}$ grains, leaves 33 grains still to be accounted for. The solution remaining after precipitate *b* was evaporated to dryness, and the residuum deflagrated with nitrate of ammonia to burn off the acetic acid, when a white porous mass remained which had all the chemical and physical characteristics of pure soda; it was neutralized with sulphuric acid and ignited, when the ignited sulphate weighed 54 grains, corresponded to *c* 24 grains of pure soda. The remaining 9 grains may be fairly assumed as the water belonging to the supercarbonate of soda, and as the moisture not expelled by the low heat to which the original precipitate was exposed.

To sum up, I conceive that congress water is composed of, in 16 troy ounce measures

Chlorine E $18 + b$	10.5	28.5
Iodine D		0.53
Bromine	a trace	
Soda	<i>c</i> partly combined with chlorine and partly with carbonic acid	24.00
Magnesia	G in the state of chloride	6.00
Lime	F do. do.	6.50
Carbonic acid	combined with soda	23.00

Or that their combinations are as follows:—

Chlorine *b* exists in the state of chloride of sodium; consequently 10.5 chlorine would require 7. sodium, corresponding to 9.33 soda, making chloride of sodium 17.5.

Chlorine E exists in the state of earthy chlorides.

Lime 6.50 corresponds to calcium 4.64 and would require 8.37 of chlorine, forming chloride of calcium 13.01.

Chlorine E is 18 grains, from which deduct 8.37, united with the calcium, the remainder is 9.63, requiring 3.21 magnesium, forming chloride of magnesium.

Magnesia G 6 corresponds to magnesia 3.6, from which deduct 3.21, magnesium combined with chlorine remains 0.39, magnesium nearly sufficient to unite with iodine 0.53. The trace of bromine has likewise a share of this magnesium, and the error is probably owing to loss in the examination.

Soda c 24 from which deduct .7 sodium united with chlorine corresponding to 9.33, soda $24 - 9.33 = 14.67$ to combine with 23 carbonic acid. This carbonic acid is too much nearly by 3, an excess probably arising from the method of estimating it; correcting this error by the atomic theory, it would stand thus:—

Bicarbonate of soda, consisting 1466 soda, 20.16 carbonic acid, and 4.12 water, forming 38.94, and the water may be imitated by

	<i>grs.</i>
Chloride of sodium	17.5
magnesium	12.84
calcium	13.01
Iodide of magnesium about	1.00
Silex	.10

Bromide do. a trace

Bicarbonate of soda $38.94 = 83.39$ grs.

in 16 ounces troy with an atmosphere of carbonic acid gas injected into a soda water fountain, and the requisite degree of spring given by an atmosphere or two of common air, an imitative water exactly analagous in its chemical and physical properties may be obtained.

N. B. Since the above analysis was performed I have discovered on the sides of the bottle in which the congress water was kept, a quantity of carbonate of iron. I did not estimate it, but I suspect Dr. Steel's estimate may be right of the quantity; but if iron exists in the original spring, I am inclined to think, in consequence of its ready decomposition by standing, that it exists in the state of iodide, and in this I am

the more inclined to retain my opinion from the fact that iodide of iron is, after some time standing, decomposed by bicarbonate of soda. In the spring we may suppose that this decomposition takes place, and that the muriate of magnesia and hydriodate of soda mutually decompose each other. The iodine of iron is besides one of the most soluble salts known.

Addenda. I shall keep on hand, for sale, the above mixture, at a moderate price, to which I recommend to add eight grains of carbonate of iron to each mixture for the gallon, as it is not likely that I shall have an opportunity of examining the spring, to ascertain whether it exists in the state of iodide.

ART. XXXIV.—*Process for the extemporaneous evolution of Iodine.* By ROBERT HARE, M. D., *Professor of Chemistry in the University of Pennsylvania.*

HEAT to the temperature of ebullition nearly, about two ounces of concentrated sulphuric acid, in a glass globe like that represented in the following figure.



It is preferable to have the whole of the globe heated by suspending it, with due caution over a large charcoal fire. Then quickly transferring it to the iron tripod, previously heated, and furnished with a small bed of hot sand, throw into the acid about half a drachm of iodide of potassium, or sodium, sometimes called hydriodate of potash or soda. Instantaneously the cavity of the globe will become replete with the splendid violet vapour of iodine, which will soon after condense on those portions of the glass which are first refrigerated, in crystals symmetrically arranged, of great beauty, and unusual size.

It is perhaps more convenient, as respects the manipulation, to have the globe suspended by a crane like that used for the suspension of large kettles, rendering it easy by a circular motion to swing them on or off the fire. By similar management the globe may be first kept over the fire till sufficiently hot, and then swung off to receive the salt. A method more attainable in the small way, is that of placing the vessel employed in a small iron skillet, in which it may be made steady by sand. Thus prepared, it may in the first place be conveniently held over the fire, and afterwards transferred to a table and supported without removing it from the skillet.

ART. XXXV.—*Improved Apparatus for showing the spontaneous combustion of Phosphorus in Chlorine.* By the author of the preceding communication.

IN my Compendium, I have given an engraving and description of an apparatus for the combustion of phosphorus in chlorine, so contrived as to prevent the odious fumes from reaching the spectators. Subjoined will be found another apparatus, constructed about three years since, by which the process is rendered still more manageable.



Suppose a cylindrical glass vessel, (see figure annexed) eight or nine inches in diameter, and about a foot in height, with a neck about four inches high, and one and a half inches in bore; the whole resembling a large decanter, without a bottom. About the orifice of the neck, let there be cemented air tight, a brass cap surmounted by a stuffing box, and having on one side a hole communicating with the cavity of the neck; this aperture must be furnished with a thumb screw, by which it may be opened or closed at pleasure. Through the stuffing box, a copper rod passes, at the lower end of which a glass or leaden stopple is so affixed as to close the lower part of the neck, into which it is ground to fit air tight. Over this stopple, a cup of copper is soldered, so as to be concentric with the rod. The rod terminates above in a handle. Within the cup, let ten or fifteen grains of phospho-

rus be placed. This is easily effected when the cup and plug are depressed into the lower part of the cavity of the vessel, by a suitable movement of the sliding rod. In the next place draw up the cup and plug into the neck so as nearly, but not entirely to close the neck, and sink the vessel into the water of the pneumatic cistern until all the air below the neck is expelled through the hole in the side of it, which is then to be closed by means of the screw, and the plug twisted and drawn into its place, so as to be air tight. After filling the body of the vessel thus, with water, place it upon the shelf of the cistern. Chlorine may now be allowed to occupy three-fourths of the space within the vessel below the plug. The process being so far advanced, it is only necessary, at the moment when it is desirable to produce the combustion, to depress the plug, and of course the cup associated with it, containing the phosphorus, into the cavity replete with the chlorine. The phosphorus soon burns actively, although with a feeble light.

The increased temperature consequent to the combustion, causes the gas to expand, but not so much as to become too bulky to be retained.

In this case, the chlorine forms a chloride of phosphorus, which meeting with water is decomposed into phosphoric and muriatic acids. By transferring the vessel after it is supplied with chlorine, to a clean porcelain or glass dish, covered by pure water, the products of this combustion might be saved, and would of course increase in proportion to the quantity of phosphorus and chlorine employed. On a larger scale, this process might be resorted to advantageously for the production of phosphoric acid, which is produced when the proportion of chlorine is sufficient; say four cubic inches for every grain of phosphorus.

ART. XXXVI.—*Experiments on Nicotiana Tabacum and Nicotine.* By JOSEPH C. TURNPENNY.

(*Extracted from Inaugural Thesis.*)

IN order to illustrate the properties of tobacco, and its proximate principle nicotine, I have carefully performed the following experiments:—

Experiment 1. To half a pound of green tobacco, freshly gathered from the plants, eight ounces of pure water were added, in which it was digested three days; after which it was subjected to filtration and pressure. To the liquor thus obtained, about half a drachm of recently calcined magnesia was added, in order to discharge the nicotine from its natural combination in the plant.

This infusion was then boiled a few minutes after the addition of the magnesia; when cold the clear liquor was decanted. While hot, the smell of tobacco was much more decided than a decoction of the same would have been without the addition of magnesia. The decanted liquor was introduced into a retort and submitted to distillation by the aid of an oil bath, temperature about 300° Fahrenheit; the nicotine passed over with the water, giving to it a slight amber colour. It commenced passing at the temperature of 260°, and its passage was very rapid at 325°. In operating on green tobacco, the process is much retarded by the presence of substances giving to the infusion a disposition to froth, and to throw itself into the neck of the retort. The amber coloured liquor was strongly characterized by the odour of the purest kind of tobacco, and when agitated with sulphuric ether, (62° Baumé) after decantation and evaporation, yielded a few grains of a slight yellow extract about the consistence of molasses, having a powerful odour of tobacco, sufficiently strong to excite, with energy, the nasal organ. The substance above described restores the blue colour of litmus paper reddened by an acid, and turns curcuma paper to a red; it forms combinations with acids in which its odour is restored. It is

unquestionably nicotine, slightly coloured by volatile colouring matter present in the plant.

Experiment 2. Half a pound of green tobacco was subjected to digestion in eight ounces of water, acidulated with half a drachm of sulphuric acid. After three days, this was subjected to filtration and pressure, and the liquor treated with sufficient calcined magnesia to neutralize the acid. It was then submitted to distillation by the aid of an oil bath, the process being in all respects similar to the one already detailed in experiment No. 1; the result corresponding precisely with the former experiment.

Experiment 3. Half a pound of dry leaves of Kentucky tobacco was digested four days in pure water, at the temperature of 70° Fahrenheit, after which it was strained, and the residue strongly pressed; a highly coloured liquor charged with tobacco was obtained, of specific gravity 1048.04; to which, when raised to the temperature of about 180° Fahrenheit, one drachm of calcined magnesia was added, and the whole was agitated. After standing at rest, it was carefully decanted, and the clear liquor submitted to distillation by the aid of an oil bath, at the temperature of 309° Fahrenheit. The distillation was effected with comparative facility, and resulted in the production of a fluid, amber coloured, and highly impregnated with the odour of tobacco. The residue, after distillation, which was suffered to cool in the retort, was of the consistence of molasses, and presented on the sides of the vessel a few granular crystals, formed either by the usual salts contained in tobacco, or some new compound occasioned by the introduction of magnesia.

The amber coloured liquor, when treated with sulphuric ether of 62° Baumé, afforded by evaporation a substance of the consistence of honey, very slightly coloured, and powerfully impregnated with the odour of tobacco; this, when evaporated nearly to dryness, yielded a granular mass.

Experiment 4. The dried leaves of Kentucky tobacco, in quantity the same as in experiment 3, were submitted to water acidulated with sulphuric acid; after digesting four days, at the temperature of 70° Fahrenheit, the liquor was separated

and more than sufficient calcined magnesia added to neutralize the sulphuric acid. The clear liquor was submitted to distillation by the means of an oil bath, as in the last experiment, and the amber coloured liquor was obtained, affording by the use of ether, the same product as there detailed.

Experiment 5. The aromatic substance obtained by ether from the distilled amber coloured liquors was combined with diluted sulphuric, hydrochloric, tartaric, oxalic and acetic acids; in each of the saline compounds, the aromatic odour was decidedly controlled by the acid, and almost suppressed in the sulphate, oxalate and tartrate. When evaporated nearly to dryness, in several of the salts granular formations occurred, but no well defined crystals.

Experiment 6. The concentrated infusion of tobacco, as directed by the Edinburgh Dispensatory, was submitted to distillation by means of an oil bath; a liquor was obtained of a light amber colour, charged with the peculiar aroma of tobacco; (not so decidedly as that obtained after the introduction of calcined magnesia into the infusion, in a previous experiment,) this liquor changed circuma paper to a light brown, which a diluted acid restored to its original colour. Litmus paper, reddened by an acid, was also restored by this liquor to its original colour. Tincture of nut-galls produced a copious light yellow precipitate.

This liquor, after remaining forty-two days, had not in the least changed its appearance. It is difficult to account for the substance said to have been produced by Hambstadt in the experiments alluded to by the Edinburgh Dispensatory; particularly as the nicotine is very soluble in water, and does not crystallize.

Experiment 7. The products from the infusions of tobacco were submitted to distillation after having been nearly exhausted by sulphuric ether, of 61° Baumé were saturated with dilute sulphuric acid, and then evaporated at the temperature of 212° Fahrenheit; a thick coloured extract was the result with traces of crystalline forms—this extract, when perfectly dry, was submitted to anhydrous alcohol, (about 40° Baumé) from which the sulphate of nicotine was obtained in solution,

and a small portion of sulphate of ammonia, in distinct crystals, were left undissolved. The ammonia resulted from the reaction of the magnesia on a salt of ammonia contained in the infusion of tobacco, and its combination with sulphuric acid from the addition of the latter previous to the evaporation above alluded to.

The following experiments illustrate the physiological character of nicotine, and although foreign to the science of pharmacy, I consider of sufficient interest to be recorded.

Experiment 8. About one-sixteenth of a grain of hydrochlorate of nicotine was given to a healthy mouse. The symptoms which immediately ensued were violent spasms of the limbs and body, laborious breathing, great prostration, nausea, inclination to sleep, pupils largely dilated, weakness in the extremities, especially the posterior, and in the course of a few hours the animal died.

Experiment 9. To a healthy mouse, a minute portion of the oxalate of nicotine was given on the point of a large needle; a narcotic effect was immediately produced—laborious breathing and vomiting. In the course of half an hour the animal recovered.

Experiment 10. To a half grown healthy cat, about one-eighth of a grain of the hydrochlorate of nicotine, dissolved in water, was given. An almost instantaneous evidence of the influence of a powerful narcotic was manifested, followed by prostration, with nausea and vomiting—first, the contents of the stomach, then frothy mucus, with violent retching. The head was inclined downwards, and the pupils dilated. The animal having vomited five or six times, gradually recovered, and appeared perfectly well thirty minutes after the exhibition of the nicotine.

Experiment 11. To the same cat about half a grain of the hydrochlorate of nicotine was given, dissolved in water; all the symptoms of a narcotic character evinced as before, were now manifested in the most aggravated form; the ears were drawn closely down upon the back of the head, she made one or two efforts to walk, when she fell, in a state of the greatest prostration, with slight convulsions of the posterior extremities;

evacuation of the contents of the rectum, the ears recovering their natural position, but not their sensibility to the touch ; the posterior extremities seemed no longer to be under her control ; being thrown in an opposite direction to that of the anterior, thereby giving a spiral twist to the back ; pupils fully dilated ; squinting of the eyes, turned upwards and outwards ; alternately laborious, hurried breathing, with rattling in the lungs and deep inspirations. In this apparently dying state, she laid about thirty minutes, after which she gradually recovered, making violent efforts to vomit, ejecting small quantities of frothy mucus. In the space of sixty minutes she had command of her extremities, but still manifested inclination to coma, with want of appetite. In about three hours, she had entirely recovered, with the exception of great weakness, and took food with avidity.

ART. XXXVII.—*Experiments on Galipæa Officinalis.*

By THOMAS J. HUSBAND.

(*Extract from Inaugural Thesis.*)

A DECOCTION of the bark was treated with subacetate of lead until it ceased to produce a precipitate. This precipitate was separated, and the clear liquor treated with hydrosulphuric acid gas, to remove the excess of lead. It was then concentrated by evaporation, and boiled with washed animal charcoal, prepared by digesting the charcoal in hydrochloric acid, and washing with water. The light coloured solution thus obtained was evaporated to an extract ; by which the acetic acid resulting from the decomposition of the subacetate of lead was expelled. This extract was digested in alcohol of specific gravity .815, until it ceased to afford any bitterness ; the alcoholic solution, when evaporated, gave a highly coloured product. This was again dissolved in water, boiled with washed animal charcoal, filtered and evaporated, when there resulted a peculiar reddish-brown uncrySTALLIZABLE substance, slightly deliquescent by exposure to a moist atmosphere.

Another portion of bark was boiled with water and quick lime, strained, and the solution treated with sulphate of zinc until no further precipitate was produced. It was then filtered and evaporated to an extract; this was treated with alcohol of specific gravity .815, until no further bitterness could be obtained, and the alcoholic solution evaporated. It was redissolved in water, boiled with washed animal charcoal, filtered and evaporated, which afforded a product similar to the preceding.

This substance is characterized by its exceeding bitter taste and peculiar smell, somewhat similar to the animalized odour of the bark. It is very soluble in alcohol and in water, but insoluble in ether. It is not affected, when in solution, by sulphate of iron, tartrate of antimony and potassa, sulphate of copper, acetate and subacetate of lead, bichloride of mercury, or by the infusion of gall-nuts. It does not neutralize the acids.

The concentrated nitric and hydrochloric acids dissolve it, forming red coloured solutions, in which the bitterness still remains. Concentrated sulphuric acid dissolves it, and at the same time the solution changes to a very dark violet colour. This solution, when diluted with water, turns to a red, and a matter insoluble in alcohol or water is deposited. Dilute sulphuric acid dissolves it without change. The similarity of this substance to salicine is, in many particulars, sufficiently striking to admit of its being classed with that article, as possessing at least a like nature, if not an identity of composition.

First. They are both procured by similar processes.

Secondly. They are insoluble in ether, but very soluble in alcohol or water.

Thirdly. Solutions of the acetates of lead, sulphate of alumina and potassa, tartrate of antimony and potassa, or infusion of galls, do not precipitate either of these substances.

Fourthly. They are similarly affected by the action of the mineral acids.

Fifthly. Salicine does not exist in a crystallizable state even in all the different species of willow. M. Peschier, of

Geneva, says that the *Salix hastata* and *Salix præcox* yield it uncrystallizable.

In continuing the analysis, the bark previously treated with water, was digested in alcohol. This solution was evaporated, which afforded an acrid resinous matter. This was distilled with a small portion of water, by which a small quantity of yellowish coloured oil was obtained, possessing the aromatic odour of the bark, and of a sharp, biting taste. Its specific gravity is greater than that of water. By the action of nitric acid, it is changed to a very bright crimson colour, the oil being at the same time decomposed.

The matter that remained in the retort after the distillation of the oil had the properties of resin. The portion of bark left after the above treatment was then digested in dilute hydrochloric acid. An excess of ammonia was added to the acidulous solution, which occasioned a white flocculent precipitate. This, on being separated and examined, proved to be magnesia. The remaining solution was then treated with a solution of oxalic acid, which produced a precipitate having the properties of oxalate of lime. The magnesia was obtained in small proportion to the lime, the latter being in comparatively large quantity. The remainder of the subject of analysis appeared to be lignin, or woody fibre. The usual reagents for fecula, tannin and gallic acid, gave no indication of their being constituents.

From the foregoing experiments, it appears that this bark is composed of gum, bitter principle, resin, volatile oil, colouring matter, lignin, magnesia and lime. The gummy matter differs, however, from pure gum, in being precipitated from its solution in water, by infusion of galls, and by most of the metallic salts, but not by alcohol except in very small quantity. The tonic properties of the bark reside without doubt in the bitter principle, and its diaphoretic and diuretic effects in the volatile oil. The resin, from its insipidity, is probably inert.

ART. XXXVIII.—*Remarks on the Vegetable Cathartics of the United States.* By JOHN C. ALLEN.

I OBSERVED with pleasure, in a late number of the Journal, an article on the vegetable emetics of the United States, and believing that any notice which may tend to attract the attention of the profession towards our indigenous productions, may be productive of advantage, I have been induced to offer a few remarks on the native and naturalized cathartic plants found in the United States, in hopes that others possessing better means of research will pursue the subject, and rescue it from the state of uncertainty in which it now remains.

In considering this class of remedies, the plants furnishing them will be spoken of according to classification of the natural orders, as given by Professor Lindley.

We do not find any native plant, said to possess cathartic properties, until we arrive at the third order, or the RANUNCULACEÆ, most of which, in a fresh state, are remarkable for their acidity, causticity and poisonous qualities. These properties, however, are generally lost by the process of drying, or in watery infusion.

The only indigenous plant in this order known to possess cathartic powers, is the *Helleborus fœtidus*; the root of which is stated by Allioni and others to be powerfully cathartic, emetic and anthelmintic; it is, in fact, the most active and energetic plant of the genus. Schœpf says that is found in Virginia, and although not used in the United States, it is much employed in domestic practice in Great Britain; from its violent, and even poisonous qualities, it is always a dangerous medicine, and requires great caution in its administration.

The next order, PAPAVERACEÆ, contains the *Sanguinaria Canadensis*. The emetic properties have been fully described in a former number of this Journal. Both Schœpf and Barton speak of its cathartic powers, but it is seldom administered as a purgative, not only on account of its uncertain action on the bowels, but also from the violence of its prior effects on the stomach.

The eighth order, *PODOPHYLLÆ*, contains the *Podophyllum peltatum*, the root of which is generally acknowledged as one of the best of our native articles of the cathartic class. Dr. W. P. C. Barton asserts, from actual experiments, that it is fully equal to the common jalap of the shops, and the authors of the United States Dispensatory say, "It is an active and certain cathartic, producing copious discharges, without much griping or other unpleasant effect." The dose is from 15 to 30 grains.

There are no decided cathartic properties ascribed to any of our indigenous species belonging to any of the succeeding orders, until we arrive at the seventy-fifth, or the *AMYGDALÆ*, and even the purgative power of any of the plants composing it are very problematical. The leaves and petals of the peach, *Amygdalus Persica* are, however, stated to act on the bowels in large doses, and the fruit, like all others of a saccharine character, possess slightly laxative qualities.

The seventy-seventh order, or the *LEGUMINOSÆ*, is not only one of the most extensive but also most useful of the vegetable kingdom. It presents several plants, among those which are native or naturalized in the United States, which are entitled to notice for their medical properties.

At the head of the list is indisputably the *Cassia Marylandica*, which, from the testimony in its favour, appears to form an excellent substitute for the Alexandrian senna; it, however, requires to be given in rather large doses. When intended for medical purposes, the leaves should not be collected until late in the summer, or about the time of the ripening of the seeds, as earlier in the season they are comparatively inactive.

The *Baptisia tinctoria*, according to Dr. W. P. C. Barton, is both emetic and cathartic in large doses, and this statement is confirmed by Thatcher; it is, however, very uncertain in its effects when administered internally, and its principal and important use, is as application in decoction or poultice to gangrenous ulcers.

The *Colutea arborescens*, which is extensively cultivated in gardens as an ornamental shrub, also forms a good substitute

for senna, and is said to be used for the purpose of adulterating this drug.

The eighty-seventh order, or JUGLANDEÆ, affords but one species possessing purgative qualities. This is the *Juglans cinerea*, an extract of the inner bark of which is a mild and efficacious cathartic in doses of from 10 to 30 grains. In its action on the bowels it somewhat resembles rhubarb, but leaves them in a more open state.

The eighty-eighth order, the EUPHORBIACEÆ, contains many plants possessed of decided cathartic powers. Most of the species of *Euphorbia* are medicinal, being endowed with purgative and emetic qualities, though they all have the disadvantage of being very uncertain in their effects. The most efficient and safest of our native species, with regard to purgative powers, is the *E. corollata*, but even this is very apt to create much gastric distress. The *E. lathyris*, which has become almost naturalized, also presents some claims to attention. The oil expressed from the seeds acts very similarly to the oil of *tiglii*, requiring, however, to be given in larger doses, and not being as certain in its effects.

The most important plant of this order, in a medical point of view, is indisputably the *Ricinus communis*, which although not a native, has become naturalized by cultivation. The oil procured from the seed of this plant is perhaps the best of the mild purgatives, and is used more universally than any other article of its class; it is too well known to render it necessary to remark further on its properties or virtues.

Order ninety-sixth, or RHAMNEÆ, possesses but one native species that requires notice, the *Rhamnus catharticus*, the berries of which are an active purgative, but are seldom used on account of their nauseous taste, and unpleasant action on the stomach and bowels.

The one hundred and twenty-ninth order, POLYGALEÆ, contains many medicinal plants, but the only one that possesses any purgative qualities is the *Polygala senega*, the root of which is extensively used as an expectorant and diuretic; in large doses it is also emetic and cathartic; the latter effect, however, is seldom obtained without emesis also taking place,

a circumstance that precludes its use as a purgative, in most cases.

The great order of VIOLACÆ and the beautiful PASSIFLOREÆ, as well as the curious SARRACENIÆ, and many other of the succeeding orders, are not known to contain any native plants whose purgative powers are worthy of notice.

In the one hundred and fifty-fourth order, PHYTOLACCEÆ, the *Phytolacca decandra* is the only plant possessing cathartic properties. In this species, however, they are of a high order, although it is difficult to administer it, without also producing emesis. Some caution is necessary in its use, as it is liable, when given in large doses, to produce convulsions and unpleasant narcotic symptoms.

The one hundred and ninety-first order, CAPRIFOLIACÆ, comprises a number of plants, which, whilst they form the delight of the florist, are also of great interest to the physician. The root and inner bark of the *Sambucus Canadensis*, are said to be drastic purgatives. This is also the case with the leaves, especially in a young state; they are always unsafe, from their uncertainty of action, sometimes operating so violently as to produce great distress.

The root of the *Triosteum perfoliatum* is a mild cathartic in doses of 20 or 30 grains, but in larger quantities is apt to affect the stomach.

In the one hundred and ninety-fifth order, or the ASCLEPIADEÆ, almost all the species are possessed of acrid and stimulating qualities, though few of them act on the bowels; some of our native species, however, are slightly purgative, in addition to their other powers.

The one hundred and ninety-seventh order, GENTIANEÆ, although generally characterized by the tonic properties of the species composing it, contains a native plant that has attained some celebrity in domestic practice as a cathartic. This is the *Frasera Walteri*, the root of which, in a fresh state, acts in a prompt manner on the bowels, and is often substituted for rhubarb. When dried, it loses its purgative powers, but forms a valuable tonic bitter.

The one hundred and ninety-eighth order, SPIGELIACÆ is

more remarkable for its vermifuge than its purgative qualities, though when administered in large doses, the *Spigelia Marilandica* will act on the bowels; it is generally necessary to combine some more efficient article with it to ensure that effect.

The two hundred and eleventh order, SCROPHULARINEÆ, includes many acrid and suspicious plants which act on the bowels. The *Gratiola aurea* possesses all the properties of the *G. officinalis* of Europe, but is seldom used; in small doses it is an active and a safe purgative; but in large ones it is apt to excite nausea and vomiting.

From the foregoing remarks, it may be perceived that but few of our indigenous vegetables can be depended on as cathartics; a few among them, however, are deserving the attention of the physician, and in case of need, may be substituted for the more expensive foreign drugs. Thus the roots of the *Podophyllum peltatum*, form a good succedaneum for jalap; the extract of the bark of the *Juglans cinerea* for rhubarb, whilst the leaves of the *Cassia Marilandica* are identical in their effects with the imported senna.

ART. XXXVIII.—*Some remarks on the Nomenclature of the celebrated Berzelius, with some suggestions respecting its amendment.* By R. HARE, M. D., *Professor of Chemistry in the University of Pennsylvania.*

ALL the binary combinations of oxygen have been called oxides, when not acid. Hence two names have been given to the compounds of that almost universal principle, actually distinguishing those which are electro-negative, from such as are electro-positive, without any view to this difference. The combinations of the electro-negative principles, chlorine, fluorine, bromine, iodine, cyanogen and its compounds, have by the French chemists been designated by the terminating monosyllable "*ure*," which by the English is translated into "*uret*;" but is not by them applied to the bodies in question

called by some of their distinguished chemists, supporters of combustion. The term *uret*, is by them restricted to compounds formed by the class of combustibles, comprised within which are carbon, sulphur, selenium, phosphorus, boron, silicon and the metals.

The chemists last mentioned use the termination *ide* to designate the combinations of the electro-negative class above mentioned, which are not acid, and hence designate as chlorides, bromides, fluorides, iodides, cyanides, compounds which the French call chlorures, fluorures, bromures, iodures, cyanures.

Berzelius, who, in referring to voltaic habitudes as a basis of nomenclature and classification, has gone further than any other writer, recommends the application of both terminations to designate the compounds formed both by the substances heretofore called supporters, and those called combustibles; the terminations in *ide* being used for the electro-negative compounds, the term in *ure* for those which are electro-positive. Sometimes, indeed, it would seem, if I understand him, that these terms are applied even where there is no corresponding electro-negative property, provided the number of atoms of the constituents correspond with those producing acidity or alkalinity, in compounds created by the union of oxygen with the same radical. Against this part of his plan, I beg leave, with the greatest deference for his transcendent ability, to object. I conceive it inexpedient that names for compounds formed of the same constituents, should vary with supposed atomic proportions, and obscure hypothetical relations.

As agreeably to the prevailing nomenclature, which in this respect is adopted by the great Swedish chemist, the electro-positive combinations of oxygen have all a termination in *ide*, it appears to me inconsistent to use this termination to designate electro-negative compounds. If the compounds of oxygen with radicals to form electro-positive bases, are called oxides, why should we not designate as sulphides, selenides and tellurides, the electro-positive compounds of sulphur, selenium and tellurium, formed with the same radicals? And since the last three mentioned bodies, when united with hy-

drogen, form electro-negative compounds, which act as acids, why not treat them as acids under appellations corresponding with those heretofore used to designate acids, other than oxacids? Thus we should have sulfhydric acid, telluhydric acid, selenhydric acid; also sulfhydrates, selenhydrates and telluhydrates. The words last mentioned are those actually used in the new Swedish nomenclature. By analogy, a student would expect the electro-negative ingredient of a sulfhydrate to be sulfhydric acid; not a sulphide of which the terminating monosyllable can, by its associations, only convey an erroneous impression.

Acids have been latterly divided, by some distinguished chemists, into hydracids, or acids produced by the union of hydrogen with a radical, and oxacids or acids produced in like manner by oxygen. The hydracids are subdivided by Berzelius, into two classes, one containing such as are created by a union of hydrogen with the class called by him halogene, comprising chlorine, fluorine, bromine, iodine, cyanogen and sulphocyanogen, and the other containing those which are formed with the four bodies which he classes under the name of amphigene, comprising oxygen, sulphur, selenium and tellurium. The halogene hydracids are decomposed by oxibases; the oxygen of the latter forming water with their hydrogen, and salts by the union of the radical of the acid with that of the base. The salts formed in this way, called by him haloid salts, are all binary compounds while dry, but on being moistened contain all the elements of a hydracid and an oxibase; and may of course be considered effectively as the same, as if the hydracid and the base had united without decomposition. The introduction of the word hydracid, as antithetical to that of oxacid, in a nomenclature founded on electrical habits, must tend to convey an erroneous impression, that hydrogen, in the one class, plays the same part as oxygen in the other. In reality, the former is the radical, the latter the electro-negative principle. Accordingly I find that Dr. Thompson does not recognize any class of acids under the appellation of hydracids; but with greater propriety places them under names indicating their electro-negative principles; as

for instance, he arranges them under the appellations severally of chlorine acids, fluorine acids, iodine acids, cyanogen acids &c. These words might advantageously, as I think, be abbreviated so as to read, cloracids, fluacids, iodacids, bromacids. To these I would add sulfacids, selenacids, telluracids.

It had been preferable, as I think, if the monosyllable designating the electro-negative compound, had been prefixed in all, as it has been in some cases. "*Hydrofluoric*" does not harmonize either with "*fluosilicic*," "*fluochromic*," or with "*fluomolybdic*," &c. &c. Fluorine being the electro-negative principle in each compound, the monosyllable indicative of its presence in them should in each occupy the same station. The same remarks will apply to the case of the other acidifying principles, with the exception of oxygen, which in obedience to long usage, is supposed to be present when no designating syllable is added.

Hence we should employ the words chlorohydric, fluohydric, borohydric, iodohydric, cyanohydric, in lieu of hydrochloric, hydrofluoric, hydrobromic, hydriodic, hydrocyanic. As, by the English chemists, the objectionable words have not yet been generally adopted, it may not be too late to introduce such as are consistent with each other.

Sulphuretted hydrogen, I would call sulphhydric acid, and in like manner the acids formed by selenium and tellurium with hydrogen, I would call selenhydric and telluhydric acids.

Berzelius alleges that the hydrofluoric acid has great tendency to enter into combination with other acids more feeble than itself, and that there are a multitude of remarkable combinations formed by it with metallic acids; yet he proceeds to observe that the latter are by their reaction with it, decomposed into corresponding fluorides, which combine with neutral fluorurets, to produce a great number of double salts. Agreeably to his new nomenclature, fluoruret (fluorure in the French translation,) is used to designate the electro-positive combinations of fluorine, while fluoride is employed to designate those which are deemed electro-negative. I shall question the existence of any characteristic in these compounds which can more justify their being described as double salts,

than the combinations arising from the union of oxacids and oxibases. Agreeably to the same authority, the reaction of a hydracid with a base is not considered as producing a combination of the one with the other, because the metal decomposes the acid by exchanging places with the hydrogen. Of course when a metal in like manner takes the place of the hydrogen in hydrofluoric acid, it ought not to be treated as if this acid entered into a combination. The learned author alleges that when fluoboric acid is received in water, at a certain period of the process, boric acid is deposited, and accumulates till the amount is sufficient to hold one-fourth as much boron as remains in the liquid in union with fluorine. The oxygen in the precipitated acid, is derived from a portion of water, of which the hydrogen is simultaneously united with the fluorine, liberated from the boron of the acid, forming thus hydrofluoric acid. This unites with the fluoboric acid, constituting thus a hydracid, with a double radical of fluorine and boron. I have already stated my objections to the idea that hydrogen should be treated as an acidifying principle when in union with substances more electro-negative than itself. I would consider the compounds of fluorine, both with boron, and with hydrogen, as acids formed by the same acidifying principle with different radicals, hydrogen and boron. Without supposing an anomalous affinity between two acids, we may explain the union of the hydrofluoric and fluoboric acids, by their common affinity for water. This view of the case appears to me to be supported by the fact, that when the proportion of water is diminished by its evaporation or a further impregnation with the gas, a decomposition ensues. Also the hydrogen of the hydrofluoric acid, restoring to the boron of the boric acid the place which it had usurped, reunites with the oxygen of the acid, and regenerates water.

There is much analogy between the phenomena, arising from the impregnation of water with the fluosilicic acid, and those which have been described as taking place in the case of fluoboric acid. By a decomposition of water, hydrofluoric acid and silicic acid are produced, by the union of silicon

with oxygen, and fluorine with hydrogen. The silicic acid, from its insolubility, precipitates, and the hydrofluoric acid and fluosilicic acid remain in solution, and, apparently, in combination. By exposure to a gentle evaporation, the silicon of the silicic acid, reunites with the fluorine of the hydrofluoric acids, while the hydrogen and oxygen again form water. Berzelius informs us that the most striking property of the hydrofluoric acid is the power of producing with the salts of potash, soda and lithia, gelatinous precipitates, which are at first hardly perceptible in the liquid, but which become manifest at the expiration of a few seconds: also that of yielding with barytic salts after a like interval, a white crystalline precipitate. By alkaline bases, in excess, this acid is wholly converted into a fluoride of the metallic radical of the alkali employed, and silicic acid; but when there is no more of the alkali presented than is necessary to saturate the hydrofluoric acid, this alone is decomposed, and the fluosilicic acid unites with the fluoride thus produced, generating a fluosilicate of the fluorides of potassium, sodium, or lithium. The resulting compound, containing no oxygen, in union with the metal of the alkali employed, is not to be confounded with such as contain that metal in the state of an alkali, and of course in that of an oxide. For instance, in the case of potash being used, a fluosilicate of the fluoride of potassium results, not a fluosilicate of potash. For the sake of brevity it would be better, I think, to say, fluosilicate of potassium. The hydrofluosilicic acid when diluted, may, to a certain degree; be concentrated by evaporation; but beyond this, fluosilicic acid gas is disengaged, and the hydrofluoric acid becomes more and more predominant in the residual liquid. "*There is no anhydrous compound of hydrofluoric and silicic acid,*" says Berzelius. "*They cannot exist together in a state of high concentration; as water is abstracted by evaporation, they separate.*" From this, I infer that they owe their union solely to their affinity for water, and that the liquid called hydrofluosilicic acid, does not deserve to be considered as a chemical combination of two acids, and still less an appellation which may lead the learner to consider it as a distinct acid. Ber-

zelius discards nitrous acid, consisting of four atoms of oxygen, and one of nitrogen, from the station assigned it by other chemists, among the class of distinct acids; because it can neither directly nor indirectly form salts, by uniting with salifiable bases. On being presented to the latter, it is always decomposed into nitric acid, and either nitric oxide, or what he calls nitrous acid, or the hyponitrous acid of other chemists.

Tried by these rules, how can hydrofluosilicic acid be recognized as a distinct acid, when agreeably to the statements of the same distinguished writer, like nitrous acid, it never enters into combination with bases, but when presented to them gives rise, by its decomposition, to other compounds?

On reading, in the admirable elementary work of the author above mentioned, his account of the double salts formed by the various substances, by him designated as halogenous, it struck me forcibly that there was a great analogy between them and the salts formed by oxygen and by other substances, called by him amphigenous, in which the electro-negative principle is an essential ingredient, both in the acid and in the base.

Agreeably to this suggestion, we should consider the chlorides of gold, platinum, palladium and of other metals which unite with chlorides ("chlorures") of other radicals, as acids. By analogy with oxides, the electro-positive compounds should be called chlorides, and the electro-negative principles should have names of acids analogical with those not containing oxygen, to which are prefixed distinguishing monosyllables, as for instance, chloroauric, chloroplatinic and chloropalladic, and the double salts, formed by these with alkaline and other chlorides, should be called chloroaurates, chloropalladiates.

Where the acid compound should contain two atoms of the acidifier to one of the radical, the term *bi* might be prefixed; and in like manner, the word *tri*, might be added, when there should be three atoms. Thus we should have bichloroaurate, trichloroaurate, and if necessary, quadrichloroaurate; perhaps it would be better to drop the monosyllable *ro*, substituting chloauric, chloaurate for chloroauric and chloroaurate.

Having spontaneously adopted these impressions, I was much pleased to find that they had been sanctioned, to a great

extent, by Dr. Thompson in his *Inorganic Chemistry*, the double chlorides being all represented by names corresponding with the suggestion above made. "I have no doubt," says this learned author, "that the number of chlorine acids will much increase as soon as chemists turn their attention to the subject. But few attempts have been made to determine whether those chlorides which contain acidifiable bases, be capable of combining with, and neutralizing those chlorides which contain alkalifiable bases." And again he observes, "It is evident from many chemical phenomena, that the chlorides of potassium and sodium are alkaline bodies, capable of combining with, and neutralizing various acid chlorides, as for example, the chlorides of gold and platinum." To these remarks I beg leave to subjoin, that if few attempts have been made with a view to determine whether the compounds of chlorine, and other bodies of the same class, are competent to produce acids and bases capable of forming salts, like those of the oxacids and oxibases, it is the more in favour of that mode of considering the subject, that so many neutral compounds, analogous to the latter, should have been produced. I regard every double salt, which is a definite compound of either chlorine, fluorine, bromine, iodine, or cyanogen, as an instance in point.

Berzelius considers the salt heretofore called ferropotassiate of potash, or ferrohydrocyanate of potash, as a double cyanure of iron and potassium, liable when dissolved in water, like other haloid salts, to be considered as an hydracid, united with an oxibase. Consistently with the views which I have presented above, it would be a cyanoferrate of the cyanide of potassium, or in other words, a compound of an acid consisting of cyanogen and iron, united with a base consisting of cyanogen and potassium.

Having ventured to offer the preceding suggestions respecting the nomenclature of Berzelius, I avail myself of this opportunity to recommend to the attention of my countrymen, his admirable *Treatise on Chemistry*, in eight volumes. Of these, I owe the possession of six, to the kindness of the author, and a seventh has since reached me by another channel.

To the six volumes I have devoted much time, and conceive myself fully rewarded by the additional knowledge derived from them. A vast number of topics are treated, more or less, in a new way, and with great ability. His work is as a fine picture, which every where displays the hand of a great master. It is especially in practical chemistry, that Berzelius stands preëminent. Sweden may, with good reason, be proud of her three great chemists, Scheele, Bergman and Berzelius.

SELECTED ARTICLES.

WE publish the following directions for the collection and preservation of plants for herbaria, hoping that it may prove as useful to others as we, from experience, have found it.

EDITOR.

ART. XL.—*Instructions for the Gathering and Preservation of Plants for Herbaria.* By CHARLES W. SHORT, M.D.

YOU ask me for instructions as to the best mode of preserving and arranging plants in your collection. This, although purely a mechanical part of the study of botany, is a very important one, since it is manifest that no one individual, at any season of the year, however favourably situated, can immediately refer to a large number of living plants at once; much less can he have them growing before him, at all seasons of the year. This difficulty is then most conveniently remedied by forming a collection of dried specimens, which, if well selected and preserved, and conveniently arranged, offers to our study and examination, at any moment, all the plants of a whole district, or even of the world. To this may be added, as the testimony of a very competent witness, and indeed, as the result of universal experience, that “no one can be a botanist without collecting plants, and making up a herbarium with his own hands.” The utility of such a collection, however, in a great degree depends upon the care and labour bestowed in forming it; and as I know of no full and specific directions to this object to which I can refer you, in any of the common systems of botany, I am the more willing to communicate to you the result of my own very considerable experience in this business. I know from my own case, and

that of many others, that beginners in this study are apt to lose the fruits of several first years' labour, from a want of that kind of definite and precise instruction so necessary on the subject. You will therefore be fortunate, and I shall be well rewarded, if your first essays in this line should be so well executed as to be worthy of future preservation.

The manual labour of a botanist in forming his collections, may be arranged under three heads, as there are three several stages in the process: these are,

I. The collection of plants in their living state.

II. The drying of them for preservation.

III. The arrangement of the dried specimens in some suitable manner for convenient reference.

I. Before commencing your herborizing excursions, you must provide yourself with a tincase, technically called a *vasculum*; a small trowel, or a strong knife. The *vasculum* is very similar to a common tin candle-box; it should not be less than eighteen inches long and six inches in diameter, having a narrow lid opening on the top nearly its whole length, and secured by a hasp or catch. If this box is somewhat flattened on two sides, so as to assume rather an oval than a perfectly circular form, it will be more conveniently carried under the arm; and for this purpose it should be provided with two loops for a strap, by which it is suspended from the shoulder.

The peculiar excellence of this apparatus is, that plants shut up in it are effectually protected from evaporation, or injury of any kind; for collections made in the morning are taken out at night in a state of perfect freshness; and they will even continue so for several days. The protecting influence of this case is still the greater if it be not painted or japanned; as the sun, being more effectually reflected from the bright surface of the tin, will be less injurious to the plants contained within it. Some prefer taking with them on these excursions an oiled bag of silk; and some a large book of bibulous paper; but the tin *vasculum* is decidedly preferable to either. The use of the trowel, or the knife, is that of taking up small plants by the roots, or cutting larger ones into convenient lengths.

Thus equipped you start upon an herborization: and here the young botanist is apt to commit his first error; for, supposing that the common and unsightly productions of his neighbourhood,—those which he has been accustomed to consider as mere *weeds*,—are of no interest whatever, he passes over all such, in search of those which are more rare, more imposing in appearance, or more beautiful in flower. This is a radical error which you must avoid, and it should be your aim to collect every thing growing in your reach, and especially all such as are natives of the country; for when you come to exchanging specimens with distant botanists you will find that they take more interest in your common weeds, than in some others which you deemed more worthy of preservation. Collect then every thing which you meet with.

Another difficulty to the beginner arises from the great diversity in the sizes and habits of the plants, from the diminutive moss to the giant oak. As a general rule in this matter, the smaller are to be collected whole; the larger ones must, of necessity, be divided. As the length of your box has been directed in reference to the size of the paper in which your specimens are to be preserved and arranged, all plants which you can get into it without doubling or bending, should be gathered entire, even with their roots; those too large for this may be cut into two, or even three pieces of the proper length; which, in general, is preferable to bending or doubling them. Of those which are still larger it will usually be sufficient to gather a specimen from the summit, or part bearing the flower, together with a few leaves growing on different parts of the stem, and those of the root; for often the leaves on different parts of the same plant, are different in shape, or modes of attachment to the stem, from each other, and these differences should always be shown in the specimens preserved. Of trees, and the most of shrubs, you must, of necessity, content yourself by gathering the smaller twigs alone, selecting such, however, as bear the most perfect leaves and flowers.

As a general rule all plants should be gathered when their flowers are most perfectly developed; and it is always desira-

ble when the flowers appear before the leaves are unfolded, as in the most of our forest trees, that specimens be gathered, both when in flower and in full grown leaf: and moreover, when the fruit is of a kind which can be preserved in the manner presently described, that specimens of the fruit should accompany those of the flower and leaf. Some flowers are so exceedingly fugacious as to shed their petals within a few hours after unfolding, as the common *Sanguinaria*, *Jeffersonia*, and *Hydrastis*; these and some others, although they be put into your vasculum with full blown blossoms, will probably be found on taking them out, to have dropped them. This is best remedied by gathering specimens of such individuals as are not quite fully expanded, and if they should not have opened by the time you are prepared to preserve them, a few hours standing in a vase of water will bring them to the proper point.

Some very extensive tribes of vegetables are so very similar in their flowers, and other parts upon which distinctions are usually founded, that it is only by referring to their fruit, or ripe seeds, that they can be satisfactorily determined. Such are the large family of *Umbelliferous* plants, and the extensive grass-like genus *Carex*, not to mention some other tribes with which you will hereafter become better acquainted. These, therefore, should be gathered when their seeds are fully grown, but before they become so ripe as to shatter off too easily. Yet even of these I would advise that specimens be gathered also in the flower, for then their leaves are generally most perfect. In selecting specimens of all plants for preservation, you should take such as are fair samples of the most common height, habit and appearance of the species; rejecting stunted dwarfs on the one hand, or luxuriant monsters on the other: at the same time if any peculiar circumstance is found to characterise particular individuals of the species, constituting what are called *varieties*, specimens indicating these variations should be collected.

II. The drying of them for preservation. This is done by subjecting them to pressure between folds of dry paper. For this purpose you must be provided with two or three reams

of unsized printing paper, and some sort of machinery for making considerable pressure. This object is well effected by a press, in miniature, made after the fashion of the common tobacco or cotton press, and may consist either of a stout lever eight or ten feet long, playing in a fixed mortice and bearing upon a firm stand; or a wooden screw of two or three inches diameter, and as many feet in length, fixed in an appropriate frame-work. Some content themselves merely with the pressure exerted by large stones, or other heavy weights, placed upon their plants; but the lever press is altogether the most convenient, and by it a much greater amount of force may be exerted than by either of the other plans. It is well to be provided, moreover, with several loose boards of different thicknesses, but of uniform size with the paper employed: and the best size for the paper is that called by printers *medium*, which should be of a good, thick and substantial body. Divide one of your reams into parcels of four or five sheets, and prevent these sheets from becoming detached by passing a few stiches through them. These parcels, thus being eight or ten double, are called *dryers*; and they may be more economically made, and answer the purpose equally well if made of old newspapers, or other kind of waste paper, provided it be smooth and bibulous. If such are used they should be trimmed to the medium size, and stiched together by means of a thread running around the entire margin. The number of these dryers required will of course be in proportion to the number of plants which you undertake to preserve. In the extensive collections which I have made during the past season, I have not found less than one hundred sufficient; but when once prepared they will answer for several seasons' constant use. Unsized paper is preferred, because it absorbs moisture from the plants, much more readily than that which has been sized.

With these fixtures you are prepared for the task before you, which consists in placing your plants in single sheets of paper, putting these sheets between alternate dryers, and subjecting the whole to pressure. This is the nicest part of the entire process, and as upon the mode in which it is done, the

value and usefulness of your collection will depend, particular instructions will be given on this head. Take then any one plant from the vasculum and lay it between the leaves of a single sheet of your paper, taking care to spread it out so as to have its parts as little confused as possible. In doing this, however, you must give to its parts no unnatural direction; for, instance, do not give to a flower which naturally droops an erect position: flower stalks which are attached to but one side, must not be turned to both: a crooked or a tortuous stem must be left so, and a strait one must not be bent: in short avoid all unnatural stiffness, formality, or artificial arrangement of its several parts, and preserve as nearly as possible the natural habit of the plant while growing—for as it is now dried it must for ever afterwards remain. This sheet, with the plant or plants so arranged in it, is then placed on one of the dryers, and another dryer laid on it. Of the smaller plants a number may be placed in one sheet; of the larger, several sheets may be required by the different parts of the same plant; but care must be particularly taken in arranging them, that the different plants thus placed in the same sheet do not overlap or overlay each other, lest under pressure they should adhere together and otherwise interfere with the drying. Of such plants as have their stems very thickly set with leaves, some of these may be removed, so as to preserve and exhibit the remainder more perfectly. Where a number of stems arise from one point, and thus interfere with the equable pressure of the specimen, some from the under and upper sides may be removed. Where the stems are thick, crooked and unyielding, the knife should be employed in removing projecting points and in thinning them; and in very large and succulent stems, as those of the *Frasera* or *Sonchus*, it is sometimes necessary to split them in two, and to press the halves with their attached leaves, flowers &c., separately. Some flowers are so crowded on their branches as to require that some be stript off for the better exhibition of the rest, as in *Vernonia*, and some of the *Eupatoriums*; and some flowers are so bulky, hard and unyielding as to render it necessary to divide and press them separately, as in some species of *He-*

Ianthus, *Rudbeckia*, *Cnicus*, *Silphum* &c.; a part of one of these large compound flowers, well pressed shows its character better than the whole badly preserved. It is a matter, moreover, of much consequence that the specimens be so flattened by pressure, as that they will occupy as little room as possible, and lie smoothly together in your Herbarium. Any obstacles, therefore, to this equable pressure of all its parts must be removed, when it can be done without interfering with the characteristic habit of the plant.

In this manner you proceed, arranging your plants in single sheets, and placing these between your dryers, until you have exhausted your vasculum, and formed a considerable pile. They are now ready for the press. Place the pile under your lever, screw, or weights; lay a thick board over it, of the proper size, and begin the pressure, making it at first moderate, so that the plants may gradually yield to its influence, without suffering violence or injury to their texture. In two or three hours the pressure may be increased, but not yet to the full amount of your power. After remaining in this situation for three or four hours longer, you will find on examining them, that all the papers, both single sheets and thick dryers, have become quite wet with the moisture absorbed from the plants; and they should now be changed. This is done simply by shifting the single sheets, without opening them or disturbing the plants, into fresh dryers, and immediately placing them under the press again, which should now be made to bear somewhat more heavily on them. Your moist dryers are then to be spread out in the open air, and in a hot sunshine, (upon boards, or on a flat roof preferably,) until they are thoroughly dried. In this way you continue transferring your sheets with their contents from moist to fresh dryers, at first twice, and afterwards once a day, increasing the pressure at each renewal, until all moisture is extracted from them, and they are rendered flat, thin and perfectly dry.

The time required for this process will vary according to the nature and peculiarities of the plants acted on. As a general rule, and for the most of plants, three days will be sufficient; yet some, as most of the grasses, are sufficiently dried

in two days ; others, more succulent, and tenacious of life, as the *Sedums* and *Talinum*, require as many weeks. These latter, and some analogous plants, even make efforts to grow for some days after being subjected to the influence of a powerful press ; others in drying cast off their leaves, as the fir tribe, the *Diospyros* &c., and some shed their flowers, as the *AGAVE Virginica*. To destroy this vegetating principle, and to dry such plants more speedily, and without a loss of their parts, it is advised to dip them in boiling water, and wipe them, before they are placed in the sheet. Some botanists prefer with such plants the yet more expeditious process of pressing them between folds of paper, under a hot smoothing iron, or a flat stone heated ; the more expeditiously, indeed, all plants are dried the better do they retain their original colours ; yet it is improper to subject them whilst drying to the influence of a hot sun, since they become thereby crisped and brittle. Notwithstanding, however, the utmost care, some plants cannot be made to retain their natural colours, but become black in drying ; this is especially the case with the *Drosera*, *Buchnera*, *Gerardia*, *Podalyria* &c., and many others assume this hue, if allowed to remain too long in damp papers.

In pressing, at the same time, a great variety of plants, it is always well to examine them once a day, and to remove from the parcel such as are sufficiently dried ; continuing to act upon the remainder until all are finished. It is, however, by no means necessary that one parcel should be entirely disposed of before another is commenced with. On the contrary, you may have under press at the same time, plants in every stage of the drying process, only taking care that thin boards are interposed between the different parcels to prevent the moisture of a fresh collection from affecting those which are dryer.

III. Still using the same thick medium printing paper, of good quality, trim the edges of it, so as to have every sheet of the same size, that they may lie more neatly together, and be more conveniently handled, than with the rough edges as they come from the mill. Into these new sheets, you next

transfer your specimens, from those in which they have been dried ; and in my opinion it is decidedly better to leave them loose, than to have them attached in any manner to the sheet, because you can examine them much more conveniently ; you may at any time substitute a better specimen for a more indifferent one ; you can more effectually protect them from the injury of insects ; and save the time and trouble required for fixing them. It is only necessary, for your own Herbarium, that one good characteristic specimen of each species be put up in this manner ; unless, in the cases before specified, where varieties obtain in the species ; where they produce flowers and leaves at different times ; or where it is necessary to preserve specimens in fruit ; in these cases, of course, specimens must be preserved, showing the species in these different stages. Any duplicates which you may have pressed over and above these, may be left in their original sheets for purposes presently to be mentioned.

This is perhaps the most convenient time for a very important, and indeed an indispensably necessary step in the business—the *labelling* of your plants. For this purpose, as you proceed in shifting your specimens, take slips of writing paper of convenient size, and write upon them, first the systematic name of the individual species—then its synonyms, and next its common English name or names, if it have any. Where any doubt exists as to the genus or species of your plant this must be expressed by the mark of interrogation (?) following after the name. To these it is always proper to add, especially if the plant be rare or peculiar to your district, various other items in relation to its history—the situation in which it is found—the character of the soil it prefers—whether marshy or dry, sandy or argillaceous, mountainous or plain &c.; together with the usual height it attains—whether annual, biennial, or perennial—time of flowering, and maturing its fruit or seeds. This label should be laid in the sheet with the species to which it belongs ; and a similar one should be left with any duplicates of the same which you may have on hand. If these particulars are not noted at the time, whilst they are fresh in your memory, you may forget them, and

afterwards have occasion to regret the want of such knowledge.

It must now be your care to protect this collection from two very noxious and destructive agents, *damp* and *insects*. For this purpose the case in which you keep them must be perfectly tight; and pieces of camphor, or bits of sponge moistened with some of the pungent aromatic oils, should be placed on each shelf among the volumes, and occasionally renewed. The more certainly still to prevent the depredations of insects, which will be found the more troublesome as you proceed southward, the collection should be looked over frequently in dry weather; and where their presence is detected they should be brushed away, and the affected specimen gently passed over with a camel-hair pencil dipped in a solution of corrosive sublimate in spirit. This not only protects it from farther injury in this way, but even brightens its colour.—*Transylvania Journal of Med.* No. 21.

ART. XLI.—*New Researches on Opium.* By S. PELLETIER.

Continued from page 158.

PART SECOND.

HAVING thus developed the course which I think should be pursued in the analysis of opium, I shall now proceed to examine in detail the immediate principles which this afforded me.

Narceine.—Pure narceine is always white and silky; when crystallized from alcohol it is in long slender needles; when crystallized from water, the crystals are more flattened; under the microscope they appear to be four-sided prisms. It has no smell, but possesses a slightly bitter taste, which is distinguished from that of morphine and narcotine, by being accompanied by a sensation analogous to that experienced from the galvanic action of zinc and silver. It requires 250 parts of boiling and 375 of cold water to dissolve it. Exposed to a high temperature, but not sufficient to decompose it, it melts; its point of fusion is about 197° F.; on cooling it

assumes the appearance of a translucent white mass; at 262° F., it becomes yellow, and on an increase of temperature it is decomposed without being sublimed. The fusibility of narceine is greater than that of morphine or narcotine. The concentrated mineral acids act on narceine very energetically, and completely change its character. These same acids, diluted with a certain proportion of water, so as not to react on the elements of narceine, combine with it, as with a salifiable base of the second order (not forming a neutral salt, but uniting in definite proportions;) but the combination of narceine with the diluted acids, as, for example, with fuming hydrochloric acid diluted with one third of water, presents some remarkable phenomena; at the moment the acid comes in contact with the narceine, this latter assumes a splendid blue colour; if a sufficient quantity of water be added to dissolve the combination, a perfectly colourless solution is the result; but sometimes before disappearing, the colour changes a purplish rose tint. This change does not always take place, especially when the water in which the blue crystals are dissolved is not acid; but by permitting the colourless solution to evaporate slowly, a purplish rose coloured crust is obtained, which finally becomes blue, if there is not an excess of acid, in which case a yellow crust forms, and the substance is altered in its properties. Desirous of ascertaining if these three tints were attributable to the water, which seemed to be the case, by the recurrence of the phenomena in an inverse order, on the evaporation of the water, I endeavoured to produce the blue in a colourless solution of hydrochlorate of narceine, by removing the water by a highly absorbent body; for this purpose I made use of salts or haloid bodies, having no acid or alkaline reaction. I placed a fragment of chloride of calcium, melted or completely dried, in a capsule, and moistened it with a colourless solution of hydrochlorate of narceine; as the chloride of calcium absorbed the water, its surface assumed the rose, purple and blue tints spoken of above. This experiment was repeated with other absorbent substances, with equal success.

Narceine dissolved in water with the aid of a weak acid,

although sufficiently concentrated to produce the blue colour of the greatest intensity, underwent no alteration. In fact, if a solution of an alkali, as potassa, soda or ammonia be added, it precipitates in white acicular crystals, resembling the narceine obtained by crystallization from its aqueous solution, preserving all its physical and chemical properties.

Having substituted magnesia in powder, for the alkaline solution, with the intention of decomposing a concentrated solution of hydrochlorate of narceine, I obtained a rose coloured pasty mass; this, in drying, became blue. Treated with weak hydrochloric acid, it dissolved without becoming coloured; with hydrochloric acid, diluted with a half part of water, it became blue; the magnesia had therefore acted on the hydrochlorate of narceine in a complex manner; the first portions had decomposed a part of the hydrochlorate of narceine, but the hydrochlorate of magnesia, in uniting with water, had transformed the undecomposed portion of the hydrochlorate of narceine into a salt, at the second degree of hydrotation; the mass having become solid, the decomposition was arrested. In substituting nitric and sulphuric acids for the hydrochloric, the same series of phenomena were obtained, except that it was requisite to dilute the nitric acid with two parts of water, and the sulphuric with four or five, to prevent the alteration or destruction of the narceine. Hydrofluosilicic acid produced the same effects.

I was not able to produce the blue colour with solutions of the vegetable acids, but by moistening crystals of oxalic, citric or tartaric acid with a solution of hydrochlorate of narceine, violet and blue zones were produced. Concentrated citric acid dissolved narceine without colouring it, but by adding chloride of calcium to the solution, the violet and blue tints appeared. We have stated that the concentrated mineral acids destroyed narceine; I observed this more particularly with the nitric. Concentrated cold nitric acid dissolved narceine, colouring it yellow, without any red tint, if no morphine was present. On heating this solution, nitrous vapours were disengaged, but not in any quantity; finally, the concentrated solutions afforded, on cooling, well characterized

crystals of oxalic acid; the mother liquor was sensibly bitter.

Metallic solutions presented no striking phenomena with narceine. The neutral or slightly acid salts of iron had no action on it, and indicated no trace of morphine, when it had been well purified. I satisfied myself that there was no relation between the blue colour produced by solutions of the salts of iron with morphine, and that produced by the acids with narceine; for ferruginous solutions, which had a marked action on morphine, produced no change in narceine; whilst the acids which coloured narceine blue, caused no such change with morphine. I said above, that on heating narceine to 197° F. it melted without alteration, and that at a temperature above 212° F. it became brown and was decomposed. If the heat be still further increased, it swells, and emits fumes which are at first whitish and afterwards yellowish, leaving much charcoal; in the receiver will be found an acid, slightly coloured liquid, and in the neck of the retort, a brown bituminous substance, of a balsamic odour; white acicular crystals are also observable, which I at first thought were carbonate of ammonia; but instead of being alkaline, these crystals were acid, reddening litmus paper, soluble in water and alcohol, and striking a blackish blue colour, with solutions of the persalts of iron. Are they gallic acid? I believe so, but the small quantity obtained did not permit me to decide positively.

<i>Ultimate analysis.</i>	Carbon	54.73	= to atoms	16
	Nitrogen	4.33		1
	Hydrogen	6.52		24
	Oxygen	34.42		8
		<hr/>		
		100.00		

Atomic weight, 2261.31.

Narcotine.—Berzelius regards narcotine as an organic salifiable base; I am of the same opinion, at the same time classing it among the alcaloids or organic bases of the second order. In fact, the combinations which narcotine forms with the acids are only permanent when the acids are powerful.

I was the first to prove, that the acetate of narcotine is decomposed by heat, and have indicated the use of acetic acid as a mode of separating narcotine from morphia. I regard narcotine as existing in opium in a free state, without the fatty matter that always accompanies it, may be considered as performing the part of an acid.

Except this be the case, all the facts detailed in the first part of this memoir, tend to show that narcotine exists in a free state in opium; and this is the opinion generally entertained in France, whilst in Germany a contrary doctrine is held. In fact, we read in a celebrated work, that if powdered opium, or the watery extract of this drug, be treated with sulphuric ether, the ether will dissolve the narcotic salts; that after the evaporation of the ether, among other products obtained, is a saline mass of a dirty brown, which reddens litmus paper, and contains a narcotic salt, the acid of which has not been discovered, that if this salt be dissolved in warm water or boiling alcohol, that the narcotine can be precipitated by ammonia.

I repeated these experiments with great care, and have found that the crystals which separate from the ethereal tincture, (crystals which may be obtained almost white, by washing them with a little very cold ether,) are insoluble in boiling water, and consist of narcotine, either pure or simply united to a little fatty matter. The ether from which they crystallized being entirely evaporated, there was a residue of caoutchouc, fatty matter, and crystals of narcotine, the whole impregnated with an aqueous fluid, which was slightly acid. This fluid was formed of water and acetic acid, holding narcotine in solution, narcotine which could be precipitated by ammonia, as is stated in the above cited work, but in quantity not exceeding a twentieth of that directly obtained by the evaporation of the ether; I am even of opinion, that the acetic acid arose from the decomposition of a small quantity of ether, for I have often remarked this formation of acetic acid in treating vegetable substances with sulphuric ether. Narcotine unites with all the strong mineral acids. However, I could not obtain any of these combinations in a crystalline form,

except the hydrochlorate of narcotine, already described by M. Robiquet.

M. Liebig, in his admirable researches on the elementary composition of vegetable alcalies, having found numbers for narcotine, a little different from those given by M. Dumas and myself, I have repeated the analysis with the greatest care. The narcotine used had been perfectly purified, it contained no trace of morphine, and was entirely freed from fatty matter, was well crystallized, and of a brilliant white. It gave

Carbon	65.16	= 17 atoms.	By calculation	65.17
Nitrogen	4.31	1		4.33
Hydrogen	5.45	17		5.31
Oxygen	25.08	5		25.07

This analysis presents very similar results to those obtained by M. Liebig, as regards the carbon and hydrogen, but I found more nitrogen; the analysis was several times repeated with the same results. Convinced of the care taken, and knowing the dexterity of Mr. Liebig, I must conclude that there was some difference in the narcotine analyzed by us; perhaps that used by Mr. Liebig contained some fatty matter.

Morphine.—This has been more studied than any other of the immediate principles of opium, nevertheless some points of its history still require elucidation. Thus, for example, the manner in which chlorine, iodine, bromine, and their compounds act on it are as yet but little known. However, I shall not go into this at present, although I have made some experiments on the subject, because I propose to make it the object of a special study, also comprising the action of the same agents on the other vegetable alcalies.

A characteristic property of morphine is that of striking a very beautiful blue colour with a salt of the peroxide of iron. This remarkable property was first noticed by Mr. S. Robiquet, but I know that neither he nor any other chemist has endeavoured to ascertain what occasioned this singular reaction. We are ignorant whether the blue colour is owing to a combination of morphine with the salts of iron without alteration, or if the morphine is altered and gives rise to a new

combination. To ascertain this I made the following experiments:—

I heated morphine with a solution of the hydrochlorate of the peroxide of iron, as neutral as possible, and highly concentrated; the morphine immediately became of a deep blue, which soon became lighter. In twenty-four hours the whole was a crystalline mamillary mass, of a dirty white colour, resembling hydrochlorate of morphine; on gradually adding water, the crystalline substance reassumed the blue colour, and was dissolved; it was promptly filtered, but not an atom of oxide of iron was separated; the liquid was then evaporated by a gentle heat; when sufficiently concentrated, and placed in a cool situation, it furnished crystals, which, when washed with a little cold water, or purified by solution and recrystallization, were found to be very pure hydrochlorate of morphine. This hydrochlorate, treated with chloride of iron, reproduced the same phenomena.

The blue liquor, when it afforded no more crystals, was subjected to several experiments; diluted with much water, it assumed a decided rose-red tint; exposed for some time to the air, it precipitated the peroxide of iron, and lost its colour. When it was prepared with water deprived of air, and kept in closed vessels, the colour was permanent, and no oxide of iron was precipitated. Before going further, we may remark, that, since there is a formation of a notable quantity of hydrochlorate of morphine, when morphine is placed in contact with a perfectly neutral solution of hydrochlorate of iron at a maximum, it must necessarily happen, that some of the hydrochloric acid is taken from the iron, but as no oxide of iron separates, this latter must remain in the fluid in the state of a new combination. We may also remark, that the iron cannot be in the state of a peroxide, as when the liquid is exposed to the air, and the iron passes into the state of a peroxide, it precipitates, and the fluid loses its colour. It would appear, then, that in the action which the morphine exercises on the hydrochlorate of the peroxide of iron, independently of the quantity which unites without alteration to the hydrochloric acid, that one portion, or some of its elements, unites with a

portion of the oxygen of the peroxide of iron, and forms an electro-negative body which combines with the oxide of iron; this combination might be called the morphite of iron. The blue liquid, which affords no more crystals of hydrochlorate of morphine, was evaporated to dryness, and left a deliquescent brownish mass, resembling tartrate of iron; this mass treated with alcohol was very slightly soluble, and a substance remained which was soluble in water, and gave it a violet tinge. The alcoholic tinctures on spontaneous evaporation, furnished a violet substance which was dissolved in sulphuric ether; the ether assumed a slight green colour. By the spontaneous evaporation of this menstruum, two distinct products were obtained; one not crystallized, this was chloride of iron; the other, in small quantity, was formed of small translucent, greenish crystals, which dissolved in water, and tinged it of a magnificent blue colour. It acquired scarcely an atom of this substance to produce this phenomenon in a considerable quantity of water. This concentration of the colouring property in this substance, and its power of crystallizing, led me to regard it as being the blue substance produced by the salts of iron with morphine, in the greatest state of purity in which it can be obtained. Finally, it appears, that in the reaction of morphine on the salts of the peroxide of iron, a portion of the morphine changes its nature by seizing part of the oxygen of the peroxide of iron, and forms with the oxide of iron, at an inferior degree of oxidation, a combination which becomes of a very intense blue on uniting with water.

Resin of Opium.—In calling the substance obtained from the marc of opium, soluble in alcohol and insoluble in ether, a resin, I had more reference to its properties, than to its elementary composition. I also avow, that I do not like to multiply the immediate principles of vegetables. Perhaps, some day, chemists will throw off the yoke, as has already been done by naturalists, and will establish a new species, or new genus, whenever observation has shown that a certain substance is possessed of essential characters which distinguish it from those among which it had hitherto been classed.

By whatever name the substance under consideration may be called, it is brown, inodorous, insipid, insoluble in water, soluble in all proportions in alcohol; softens by heat, and becomes almost liquid; heated over a naked fire, it swells, and affords much empyreumatic oil, and percarburetted hydrogen.

It readily dissolves in the alcalies, even in the cold; its solution in ammonia is permanent. In considering it as a resin, it would occupy a place among the highly electro-negative, according to the classification of Unverdorben, admitted by Berzelius. The solution of the resinous matter of opium in soda or potassa, takes place without a disengagement of ammonia, although it is an azoted body; but this is also the case with morphine.

It is owing to the presence of nitrogen, which I found in this body, in making its elementary analysis, that it should be separated from the resins, from the most of which it also differs by its insolubility in ether.

The results of its analysis are:—

Carbon	59.825	= atoms 16.	By calculation 59.51
Nitrogen	4.816	1.	4.30
Hydrogen	6.813	23.	6.98
Oxygen	28.546	3.	29.19

Oleaginous matter of Opium. This substance, which accompanies the narcotine obtained from the marc, and which can be separated from it, by the processes described in the first part, is generally yellow or brownish; I am, however, of opinion that the yellow or brown colour is foreign to it, and that in a state of purity, it would be white. I have even obtained it, two or three times almost colourless, by dissolving white narcotine, obtained from the marc by means of alcohol, and placed in contact with animal charcoal, in very diluted hydrochloric acid; in bleaching the narcotine, the fatty matter that accompanied it, was also whitened. This fatty or oleaginous matter, which is found in small quantities in opium, ought rather to be considered as a fatty acid analogous to the oleic, than as a neutral substance. In fact, notwithstanding reiterated washings, the fatty matter retains acid properties; its alcoholic solution reddens litmus paper,

and also affords another reason for considering it as a fatty acid, for it is well known that fatty bodies, which are not acid, are in general less soluble in alcohol than those which are acid. Finally, it unites almost instantaneously with potassa and soda, and forms true soaps. If these be decomposed by tartaric acid, the fatty matter is obtained in the same state as at first. Burned with deutoxide of copper it furnished no nitrogen. It is formed of—

Carbon	72.39 = atoms	6
Hydrogen	11.82	12
Oxygen	15.78	1

Caoutchouc of Opium. The name of caoutchouc, given to this substance by M. Robiquet, in my opinion ought to be retained; from comparative experiments which I have made, I have proved that the caoutchouc of commerce and that of opium, are too analogous in their properties, not to be considered as belonging to the same species; at most they are but varieties. I have remarked, that substances which dissolve the caoutchouc of commerce, as naphtha, the volatile oils, and some ethers, also dissolve the caoutchouc of opium; this latter is more readily dissolved than that of commerce; this arises, in all probability, from its less aggregated state. The mean of four analysis is as follows:—

Carbon	87.89 = atoms 3.	By calculation	88.025
Hydrogen	12.11	5.	11.177

These results differ exceedingly little from those obtained by Mr. Farady, in the analysis of common caoutchouc; this able chemist found that caoutchouc was formed of carbon 87.2, and hydrogen 12.8.

Other immediate principles of Opium. Leaving the account of meconine to M. Conerbe, it remains for me to speak of the meconic acid, the brown acid extractive matter, the bassorine, the gum and woody fibre; but these three last substances are of too little importance to require further notice; I shall also abstain from speaking of the meconic acid, as I have understood that M. Robiquet is engaged in investigating it. As to the brown acid, I must confess that I have not sufficiently studied it to present any thing definite.—*Journal de Pharm.*

ART. XLII.—*Apparatus and Processes.* By ROBERT HARE, M. D., Professor of Chemistry in the University of Pennsylvania.

1. *Improvement on Brunner's process for potassium.*

WHEN I first went through Brunner's process for potassium, as modified and described by Berzelius, I conceived the idea of substituting, for the piece of a gun barrel between the iron bottle and receiver, an iron cylinder much larger in bore, and using an iron vessel without naphtha, instead of that recommended by the great chemist last mentioned. From the employment of this, much inconvenience was experienced; as in consequence of reiterated explosions, every one present was more or less bespattered with naphtha. Subsequently I found that in both of my conceptions I had been anticipated by Dr. Gale of New York. Agreeably to my latter experiments, I find that the receiver may be dispensed with advantageously on every account. I have successfully employed a hollow iron cylinder of about two inches in bore, and fifteen inches in length; which is at one end fastened into the generating bottle by screwing, and at the other end receives a piece of a gun barrel to which a lead pipe is adapted, so as to be air tight. This pipe is recurved in such a manner, as to convey the gas and fumes into the ash hole of the furnace employed.

By means of a keg supplied with water, from which proceeds a lead pipe furnished with a cock, a stream of water is directed upon the iron cylinder sufficient to keep it cool. The water, as it runs off from the cylinder, is caught in a flat dish, from which it is conveyed by another lead pipe. Thus refrigerated, the cylinder retains nearly all the condensable potassium. The receiver, should not, however, be allowed at a minimum, to be below a boiling heat in the coldest part, as in that case aqueous matter is detained in it, and, I believe, re-oxidizes more or less of the potassium. Towards the close of the process, to prevent the condensable matter from obstructing the narrow part of the receiver next the bottle, it must be kept in a state of incandescence.

Operating with the proceeds of seven pounds of bitartrate

of potash, properly carbonized, I have obtained of the metal in question, seventeen hundred grains in pieces large enough to be conveniently lifted by forceps. But as in boring the metal out of the tube inflammation is liable to ensue, unless naphtha be applied, the potassium thus extricated is much imbued with this liquid, with which it always has a reaction productive of some loss. Besides, a considerable proportion of it, is always deposited in a state of mixture or combination, with a carbonaceous matter, from which it can be completely separated only by intense heat. Hence I deem it preferable, after removing the cylinder from the bottle, to close one end by screwing on an iron cap provided for that purpose, to adapt to the other a piece of a gun barrel duly recurved, and proceed to distillation. I have tried distillation *per descensum*, which has the advantage of allowing a portion of the metal to be extricated by simple fusion. The last portions, however, can only be obtained at a white heat. I must confess that I have not as yet been enabled to make up my mind as to the method which may be upon the whole preferable in this part of the process. From actual trials it appears that it is possible to receive the potassium, as it comes over by distillation, in a bottle, replete with hydrogen desiccated by chloride of calcium. I have constructed an apparatus, by which I expect this method of operating will be rendered more easy and effectual, but I have not as yet put it into operation.

Notwithstanding its unusually large calibre, the cylinder became repeatedly so clogged by the metal and the carbonaceous deposit, as to occasion some difficulty in keeping the passage clear; and likewise some loss of potassium, of which a considerable quantity always accompanied the rod used for the purpose when retracted. In order to remedy these evils, as a substitute for the iron cylinder above mentioned, I have had another equally long receiver forged, of which the bore at each orifice is two inches in diameter, but enlarges at a little distance from either end to two and a half inches. I hope that the cavity of this receiver will be adequate to receive all the condensible products without being obstructed.

I intend hereafter to furnish a more complete description of my process for potassium, illustrated by a cut.

I have made an improvement in the art of luting. It consists in using the shreds of iron which are shaved off in making weavers' reeds of that material. These shreds are entangled together like the fibres of wool, and constitute a mass which, by analogy, we have called iron wool. With these shreds, fire clay blended with as much sand as is consistent with the necessary plasticity is intimately intermingled and stamped into a flat cake of a size sufficient to envelope the bottle completely. Being applied to the bottle, it is afterwards secured by a wire wound about it in a spiral, of which the rounds are not more than a half inch asunder, and the ends are duly secured by twisting them together.

The effect of this intermixture of iron fibres is surprising. The lute hardens on exposure to the fire without previous desiccation.

I rolled up two equal balls, one consisting of fire clay alone, the other of the same clay intermingled with the iron wool. Both were thrown into an intensely heated part of an anthracite fire. The ball which consisted of clay alone, soon flew to pieces, while the other retained its shape, and hardened into a mass having the firmness of a brick.

The plan proposed by Dr. Gale of keeping potassium in glass without naphtha, is one which I have pursued since 1818. I have been accustomed to seal a tube at one end, then to heat it at a convenient distance from the end, and reduce the diameter by drawing it down to about a quarter of an inch. Into the tube thus prepared, hydrogen is made to enter, so as to exclude the air. The potassium being then introduced, and the open end of the tube closed by means of a spirit lamp, the metal may be fused, and with a little dexterity may be transferred in pure globules to that part of the cavity of the tube which is between the sealed end and the narrow part. This object being effected, the tube is divided at that part, and sealed by fusion.

In this case, the potassium usually falls upon the glass and

adheres to it, presenting a perfectly brilliant metallic coating, and preserves this appearance without diminution for years.

It is however liable to inflammation from slight causes when kept without naphtha. I had an ounce of it in a small phial for eighteen months which took fire on my venturing to divide the phial by means of a file.

An account of an explosive compound produced by the reaction of naphtha with potassium.

I avail myself of this opportunity of mentioning a circumstance which occurred in January, 1831, and which I should have mentioned before, had I not hoped to have had leisure to ascertain the cause of the phenomenon.

Having some globules of potassium of a size so small as to be separated with difficulty from the naphtha with which they had been intermingled; I endeavoured to get rid of the naphtha by heat. With this view I heated the whole mass in a sealed tube, properly recurved to act as a retort. The glass, when heated to the boiling point of the naphtha, became quite black, so as to lose its transparency. When all the naphtha had been expelled, I inverted the tube in another of a larger size filled with hydrogen, and otherwise prepared as above mentioned. A few globules of the metal ran into the tube thus prepared, and were secured there; so that, to this day, their brilliancy is unimpaired, and they still have in some points, a striking degree of brightness. They are accompanied by a few drops of a colourless naphtha which is still unchanged.

Being dissatisfied with the quantity of potassium thus procured, I proceeded to examine the caput mortuum left in the tube used as a retort. With this view, striking it with a hammer, I was startled by a violent detonation. From the circumstance that this result was the consequence of the reaction of potassium, naphtha, and flint-glass, it seems to be distinguished from the explosions which are well known to occur in the process above alluded to, by which potassium is obtained from carbonate of potash, according to Brunner.

I have already mentioned that in the first operation which I made after that plan, I used the copper vessels recommended

by Berzelius. The inner vessel having been allowed to remain in connexion with the gun barrel, which formed the means of communication between it and the iron bottle, for thirty-six hours after the process was terminated, my assistant attempting to effect a separation, struck the neck of the receiver with a hard body. Immediately a detonation ensued, as violent as if a musket had been fired, and the receiver, though open at one end, was bulged from a square nearly into a cylindrical form. In this case it might be imagined that naphtha had some agency, yet it could have had but little access to the part of the apparatus from which the explosion proceeded. Besides, Dr. Gale mentions that he met with explosions in removing potassium and its accompaniments from the interior of the tube, when no naphtha had been used, and he recommends the affusion of that liquid, as a preventive of explosion.

The rod employed to keep the passage through the iron cylinder free as above mentioned, coming out coated with potassium, I strove to detach it by scraping, and to save it by receiving it in naphtha. I succeeded in amassing in this way a quantity worthy of the trouble. In scraping the rod for this purpose by the edge of a square bar, explosions constantly took place as the latter came in contact with a bluish matter, the nature of which I could not ascertain. Berzelius ascribes these explosions to moisture; but they have occurred, as in the instance above mentioned of detaching the receiver, where moisture could not have contributed to the result.

Of a method of filling tubes with potassium.

I have succeeded in filling glass tubes with potassium in the following manner. One end of a tube is luted to one of the orifices of a cock; to the other orifice, the neck of a gum elastic bag of a suitable size is attached. The open end of the tube is reduced in diameter by means of a flame excited by the blowpipe, so as to have an orifice about large enough to receive a knitting needle. The gum elastic bag is filled with hydrogen, and the cock closed. Meanwhile the potas-

sium is heated in naphtha, in a larger tube, till it lies at the bottom in a liquid state.

In the next place, the bag is grasped with one hand, and subjected to pressure, at the same time introducing the small orifice of the tube into the naphtha, the cock is opened till the hydrogen begins to escape in bubbles. The escape of the bubbles is kept up to prevent the naphtha from entering the tube, and to evacuate the bag. Before this is quite accomplished, the orifice of the tube is to be approximated to the surface of the potassium as nearly as possible without entering it, and just as the last of the gas is expelled, is to be merged in the metal.

The cock is at the same time to be closed, and the pressure of the hand on the bag discontinued. The cock being in the next place very cautiously opened, the elasticity of the bag counteracts the pressure of the atmosphere within the tube; and the liquid potassium is forced to rise into it. This effect may be controlled by the cock, which is to be closed when the column of the metal has attained a satisfactory height. After being removed, cooled and separated from the cock, the tube may be closed by a covering of sheet gum elastic, such as is procured by the inflation of bags softened by ether. Any portion of the contents thus preserved may be extricated by cutting off and fracturing a portion of the tube, adequate to yield the requisite quantity.

In order to guard against accidents the apparatus was heated in this process by a bath of naphtha; in a bath of hot water. For the object last mentioned, the vessels ordinarily used for the solution of glue were employed, the naphtha being placed in the inner vessel usually occupied by the glue.

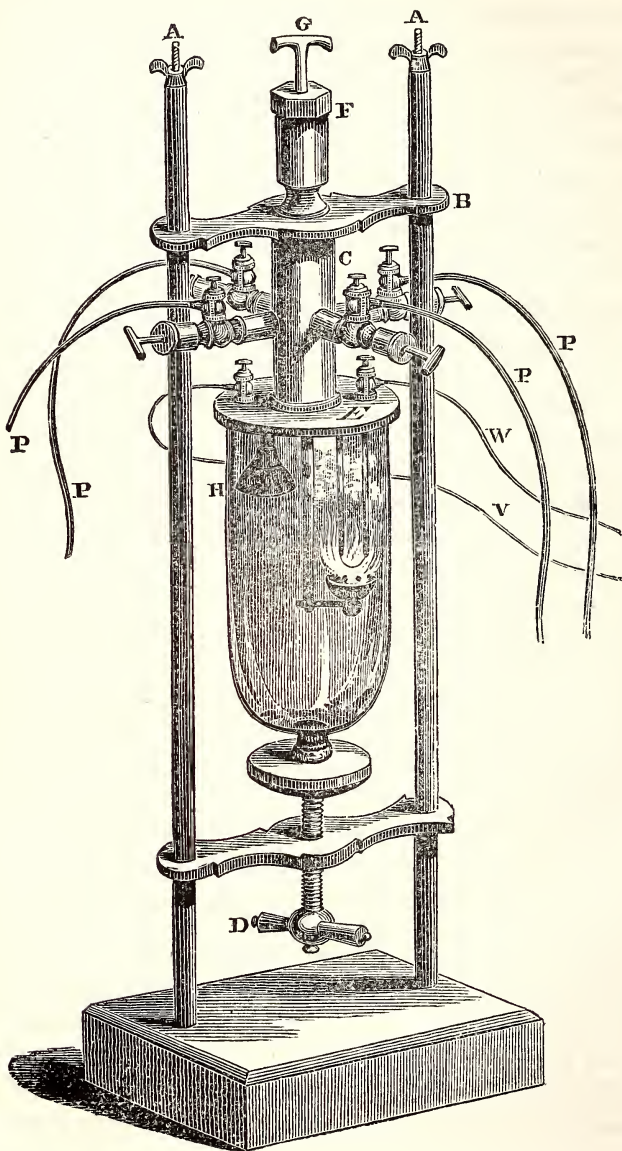
I have long been in the practice of filling tubes with phosphorus by a similar process.

2. Apparatus for evolving Silicon from Fluosilicic Acid Gas.

Into a stout mahogany block as a basis, two iron rods A, A, are so planted as to extend perpendicularly, and of course parallel to each other, about two feet in height. Upon these rods two iron bars are supported horizontally, one, B, near their upper extremities, the other at the height of about six inches from the wooden basis. In the centre of the lower bar, there is a screw, D, having a handle below the bar, and supporting above it a circular wooden block. Into a hole in the upper iron bar, equidistant from the rods, is inserted a hollow brass cylinder, C, which at the lower end screws into an aperture in a circular plate of brass, E, which is thus supported horizontally a few inches below the bar. By these means room is allowed for the insertion into the cylinder of four valve cocks, each furnished with a gallows screw. The cylinder is surmounted by a stuffing box, through which a copper sliding rod, G, passes air tight. The brass plate is turned and ground to fit a bell glass of about five inches in diameter, and eight inches in height, which is pressed up when necessary between the plate and the block by the screw D, supporting the block. Within the space comprised by the bell glass, and on one side of the centre of the plate, two stout brass wires are inserted, one of them insulated by a collet of leathers, so as to admit of the ignition, by a galvanic discharge, of a small arch of platina wire, which terminates them. The sliding rod above mentioned as occupying the stuffing box, terminates below the plate in an elbow which supports a cup at right angles to the rod, at the same distance from the rod as the platina wire, and on the opposite side of it, there is a brass cover, H, for the cup, supported from the plate. The arrangement is such that by a suitable movement in the sliding rod, made by grasping it by the handle G, in which it terminates externally, the cup may be made either to receive into its cavity the platina wire, or to adjust itself to its cover H.

The bell being removed, about sixty grains of potassium in pieces not containing more than fifteen grains each, are

APPARATUS FOR THE EVOLUTION OF SILICON FROM FLUOSILICIC ACID GAS, BY MEANS OF POTASSIUM AND A WIRE IGNITED BY A CALORIMOTOR.



to be introduced into the cup, which is then to be adjusted to the cover, and the bell secured. In the next place, by means of the flexible lead tubes, P, P, P, P, and the gallows screws attached to the valve cocks, establish a communication severally with an air pump, a self-regulating reservoir of hydrogen, a barometer gage, and a jar over the mercurial cistern containing fluosilicic acid gas. First, by means of the air pump exhaust the bell, and in order to wash out all remains of atmospheric air, admit hydrogen from the reservoir. Again exhaust, and again admit hydrogen. Lastly, exhaust the bell of hydrogen and admit the fluosilicic acid gas. By means of the gage, the exhaustion is indicated and measured, and by the same means it will be seen when the pressure of the gas within the bell, approaches that of the atmosphere. When this takes place, the cocks being all closed, by means of a calorimotor, the platina wire is to be ignited, and the potassium brought into contact with it.

A peculiar deep red combustion ensues, evolving copiously chocolate coloured fumes, which condensing into flocks of the same hue, subside throughout the receiver, (excepting the colour,) like snow in miniature. On removing the bell after the potassium is consumed, the cup which held it will be found to contain silicon mixed with the fluoride of potassium, and with this indeed the whole of the powder deposited is contaminated. Silicuret of potassium is likewise formed in the cup, since on the affusion of water, a fetid evolution of silicuretted hydrogen ensues. By repeated infusions, first in cold, and afterwards in boiling water, agreeably to the directions of Berzelius, the silicon is left in the state of a brownish ash coloured powder.

Thus obtained, silicon does not appear to be acted on either by sulphuric, nitric, fluoric, or muriatic acids; nor when exposed to nitrate of potash liquified by heat. It seems to be soluble for the most part in a mixture of nitric and fluoric acid, which by analogy we may call nitrofluoric acid; but after exposure for eighteen hours to this solvent, a small proportion of a black matter remained undissolved. This is, in all probability, carbon derived from the potassium, which, ac-

cording to Berzelius, when obtained by Brunner's process, is liable to be combined with carbon. The solution of nitrofluoric acid, decanted from the residual black powder into a solution of pearlash, gave a copious, white, gelatinous precipitate like silex, which, when thrown into a large quantity of water, subsided undissolved. When on subjecting the silicon to red hot nitrate of potash, anhydrous carbonate of the same alcali was added, so as to coöperate with the nitre, an explosive effervescence took place. All the silicon disappeared, and a compound resembling the silicate of potash was produced. This anomalous reaction may be considered as characteristic of silicon.

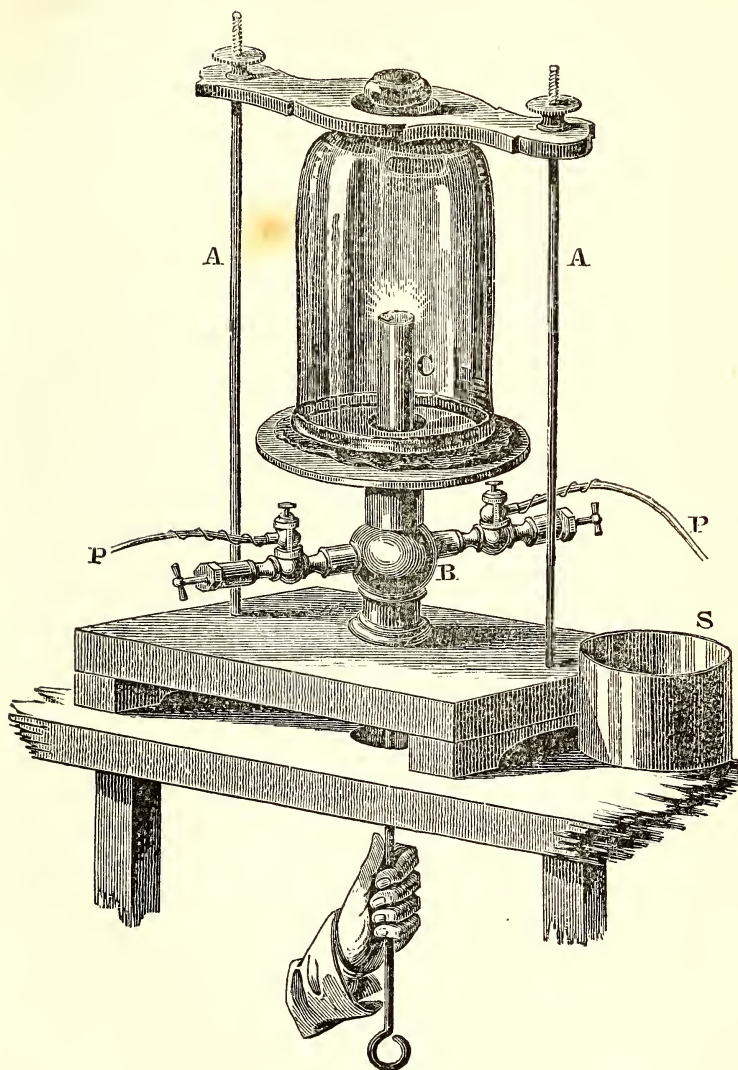
The impression that the black matter insoluble in the nitrofluoric acid, was carbon, is confirmed by the fact, that after the silicon had been digested for some hours in strong nitric acid, and finally boiled in it to dryness, it dissolved in nitrofluoric acid without any such residuum.

3. *Improved process for the evolution of Boron.*

By means of an apparatus represented by the annexed engraving, I have succeeded in evolving boron by the reaction of potassium with vitrified boracic acid, in vacuo, without encountering the evil of any explosive action, to which the process, as heretofore conducted, in pleno, has been found liable.

A circular brass plate, is prepared, like the plate of an air pump, so as to produce with any suitable receivers properly ground, an air tight juncture. It is supported on the upper end of a hollow brass cylinder, B, with the bore of which it has a corresponding aperture. The brass cylinder is about three inches in diameter, and six inches in height, being inserted at its lower end into a block of wood as a basis. This cylinder receives below, a screw, which supports a copper tube, C, of about two inches in diameter, so as to have its axis concentric with that of the cylinder, and to extend about four inches above the plate. The copper tube, thus supported, is closed at the upper termination by a cup of copper, of a shape nearly hemispherical, and soldered at the upper edge, to the edge of the tube; so that the whole of the cavity of the cup is within that of the tube. Hence the bottom of the cup is accessible to

APPARATUS FOR THE EVOLUTION OF BORON FROM BORACIC ACID,
BY MEANS OF POTASSIUM.



any body, not larger than the bore of the tube, without any communication arising between the cavity of the tube, and that of any receiver placed upon the plate, over the cup and tube, as in the figure.

Into the side of the cylinder supporting the plate, a valve cock is screwed, by means of which, and a flexible leaden tube, a communication with an air pump is opened, or discontinued, at pleasure.

The cup being first covered with a portion of the vitrified boracic acid, as anhydrous as possible, and finely pulverized, the potassium is introduced, and afterwards covered with a further portion of the same acid, two parts of the potassium being used for one of the acid. A large glass receiver is now to be placed on the plate, secured by rods, A, A, concentric with the tube and cup; from the heat of which the glass is to be protected by a bright cylinder of sheet brass, S, placed around it so as to be concentric with the receiver and tube.

The apparatus being so prepared, and the receiver exhausted of air by means of the air pump, an incandescent iron is introduced through the bore of the tube, so as to touch the bottom of the copper cup. In a short time a reaction commences, which aiding the influence of the hot iron renders the cup and its contents red hot. A deep red flame appears throughout the mass, after which the reaction lessens, and the heat declines.

When the cup has become cold, the air is admitted into the receiver, and the contents are washed with water. If any of the acid has escaped decomposition, it may be removed by boiling the mass with a solution of potash or soda. After this treatment and due desiccation a powder will remain, having the characteristic colour and properties of boron.

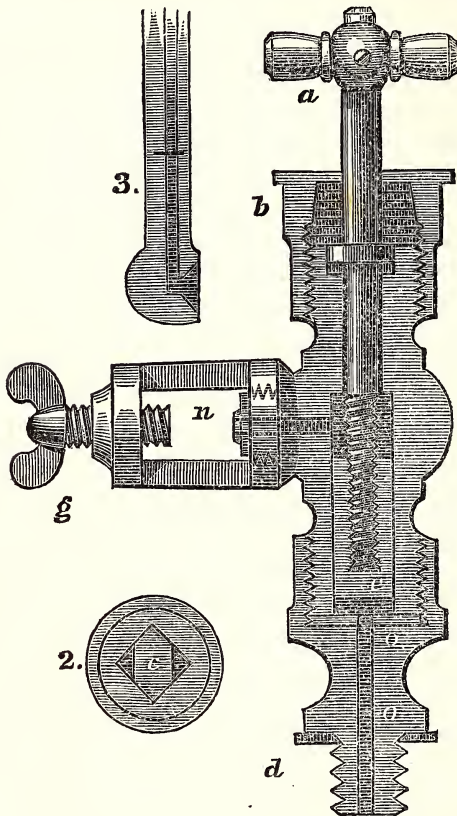
The additional valve cock, represented in the figure, gives the option of introducing dry hydrogen for the purpose of washing out atmospheric air, as described in the process for silicon.

4. *Description of the Valve Cock, a perfectly air tight substitute for the common Cock, alluded to in the preceding article.*

This figure is intended to illustrate the construction of a substitute for a common cock, which I have been accustomed to call a valve cock. It was devised by me about twenty years ago, among a number of other analogous contrivances, and seems upon the whole less liable to fail than any other which I have tried. The engraving represents a longitudinal section of the valve cock. At *a* is a piston with a collar enclosed in the stuffing box *b*, so as to be rendered air tight by means of oiled leather. Hence the piston may be turned or made to revolve on its axis, while incapable of other motion. Upon the end of the piston a thread for a screw is cut which fits into a female screw in the brass prism *c*, so as to cause this prism to approach to, or retreat from a bearing, covered by leather, in the centre of which there is a perforation *oo*, communicating with one of the orifices of the instrument. This orifice is surrounded by the male screw *d*, so that by means of this screw, the valve cock may be fastened into an appropriate aperture, properly fitted to receive it, subjecting an interposed leather to such pressure, as to create with it an air tight juncture. The prism *c*, has two of its four edges cut off (see fig. 2,) so as to allow a free passage by it, reaching to the lateral perforation terminating in another orifice, over which there is a gallows screw, *g*. By means of this gallows screw, when requisite, a brass knob, such as that represented by a fig. 3, soldered to a leaden pipe, may be fastened to the valve cock. The juncture is rendered air tight by the pressure of the screw in the gallows, upon a leather which is kept in its place, by means of the nipple *n*.

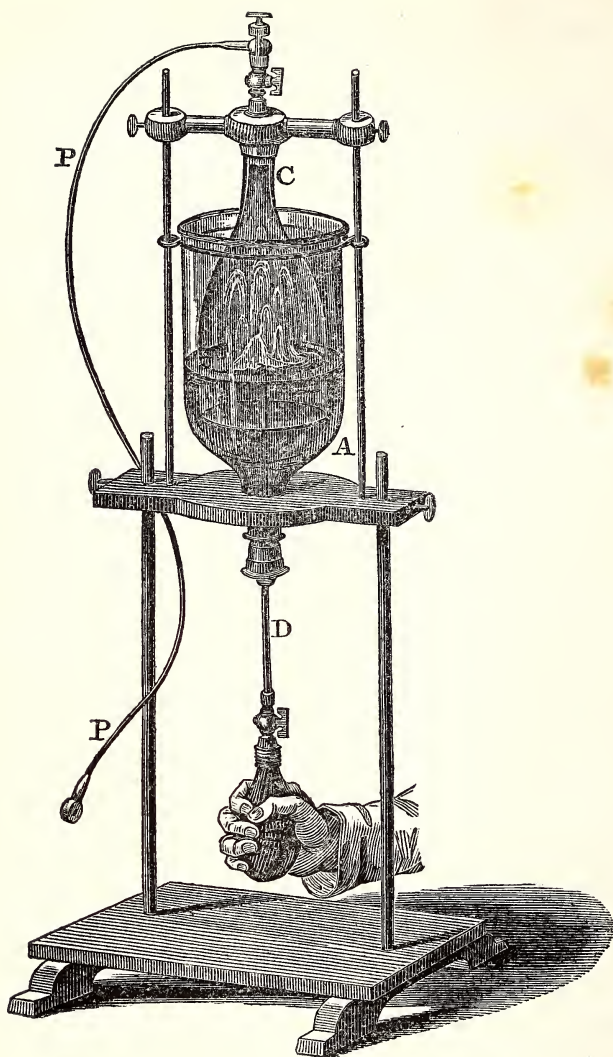
The method last mentioned, of producing an air tight juncture, was contrived by me about seven years ago, and proves to be of very great utility. There is no other mode with which I am acquainted, of making a perfectly air tight communication, between the cavities previously separate, at all comparable to this in facility.

THE VALVE COCK—A PERFECTLY AIR TIGHT SUBSTITUTE FOR
THE COMMON COCK.



5. *Apparatus for separating Carbonic Oxide from Carbonic Acid, by means of Lime Water.*

Lime water being introduced in sufficient quantity, into the inverted bell glass, another smaller bell glass, C, is supported within it as represented in this figure. Both of the bells have perforated necks. The inverted bell is furnished with a brass cap having a stuffing box attached to it, through which the tube D of copper slides air tight. About the lower end of this tube, the neck of the gum elastic bag is tied. The neck of the other bell is furnished with a cap and cock, surmounted by a gallows screw, by means of which a lead pipe P P, with a brass knob at the end suitably perforated, may be fastened to it, or removed at any moment. Suppose this pipe, by aid of another brass knob at the other extremity, to be attached to the perforated neck of a very tall bell glass filled with water upon the shelf of a pneumatic cistern: on opening a communication between the bells, the water will subside in the tall bell glass, over the cistern, and the air of the bell glass C being drawn into it, the lime water will rise into and occupy the whole of the space within the latter. As soon as this is effected, the cocks must be closed and the tall bell glass replaced by a small one filled with water, and furnished with a gallows screw and cock. This bell being attached to the knob of the lead pipe to which the tall bell had been fastened before, the apparatus is ready for use. I have employed it in the new process for obtaining carbonic oxide from oxalic acid, by distillation with sulphuric acid in a glass retort. The gaseous product consists of equal volumes of oxide and carbonic acid, which, being received in a bell glass communicating as above described by a pipe with the bell glass C, may be transferred into the latter through the pipe, by opening the cocks. As the gaseous mixture enters the bell C, the lime water subsides. As soon as a sufficient quantity of the gas has entered, the gaseous mixture may, by means of the gum elastic bag and the hand be subjected to repeated jets of lime water, and thus depurated of all the carbonic acid. By



raising the water in the outer bell A, the purified carbonic oxide may be propelled, through the cock and lead pipe, into any vessel to which it may be desirable to have it transferred.—*Amer. Jour. Science and Arts*, July 1833.

ART. XLIII.—*On the Apocynum androsæmifolium*. By WILLIAM ZOLLICKOFFER, M. D., late Lecturer on Botany, Materia Medica and Toxicology &c. &c.

THIS genus is characterized as follows:—*Folliculi 2, longi, lineares. Semina papposa. Corolla campanulata. Anthera mediocum stigmati cohærentes.*

Species *undrosæmifolium*—*Foliis ovatis, glabris, cymis terminalibus, lateralibusque; tubo corollæ calycem superante.* The root of this plant is perennial; “stem herbaceous, erect, two to three feet high. Leaves opposite, ovate or oval, lanceolate, mucronate, and somewhat glaucous underneath. Corolla monopetalous, five-cleft, white, tinged with red. Nectary, five oval glands surrounding the germ, purple, viscid. Anthers scarcely as long as the corolla.”

According to Walter and Michaux, this species of *Apocynum* is an indigenous plant, growing naturally from Canada to Virginia. In Maryland it is to be seen almost every where. Here it is recognized by the common and local appellations of silk-weed, milk-weed, snakes-milk, dogs-bane &c. It is very incorrectly supposed by the peasantry to possess noxious properties. It is a lactescent plant, emitting upon the slightest incision into its cortical part, a profuse milky exudation, which, when exposed to atmospheric action, assumes the consistence of caoutchouc, and burns with considerable vividness, with flame analogous to that which results from the combustion of alcohol.

Chemical composition.—Resin, caoutchouc and mucus, are the chemical constituents entering into the composition of the *androsæmifolium*.

Solubility.—Its active properties are soluble in water and alcohol. Macerated for seven days 3240 grains of the con-

tused bark in alcohol, from which I procured, after carefully passing it through bibulous paper, and evaporating it over a water bath, 178 grains of alcoholic extract, and 28 grains of watery extract. Inversely from the same quantity I obtained 160 of water, and 104 grains of alcoholic extract.

Incompatible substances. It should not be given in combination with opium, when emesis is intended to be produced by its administration, not only because it frustrates its emetic action, but in consequence of it so modifying its operation as to cause it to display its effects upon the surface. *Capsicum annuum* completely controuls its emetic operation. In three instances I have taken a sufficient quantity to excite vomiting, in combination with five grains of the powdered *Capsicum annuum*, but without the least effect whatever.

Vegeto-anatomical examination.—Twenty-five hundred and thirty-six grains of the recent root afforded upon a separation of the different parts entering into its structural organization, 1726 grains of cortex or bark, and 810 grains of ligneous or woody part. Its activity resides exclusively in the bark, which composes rather more than two-thirds of the root.

Medical virtues.—It is tonic, emetic and diaphoretic. In doses of from ten to twenty grains it is admirably calculated to improve the tone of the digestive apparatus, and through this medium produce a corresponding impression upon the general system. Forty grain doses excites emesis very promptly, without inducing scarcely any previous nausea. It is therefore a mild and effectual emetic, and deservedly entitled to a conspicuous place in our pharmacopœias and apothecary shops. It is diaphoretic when given in combination with opium, *only* in the dose of forty grains with one of opium; exhibited at intervals of three or four hours.—*American Journal of the Medical Sciences.*

MINUTES OF THE COLLEGE.

March 26, 1833.

THE Board of Trustees reported that they had conferred the degree of graduate in Pharmacy upon Samuel Simes, Thos. H. Powers, Thomas J. Husband, Jos. C. Turnpenny, Wm. P. Hansford, Watson J. Welding, Edward Hopper, and Samuel C. Brown.

The Committee of Publication made a report which was accepted.

A committee was appointed to take into consideration the subject of weights and measures, and the propriety of procuring for the College standard sets of the same, in accordance with the Pharmacopœia of the United States.

The following gentlemen were duly elected Officers, Trustees &c. for the ensuing year:—

President—Daniel B. Smith.

Vice Presidents—S. Jackson, M. D., Henry Troth.

Recording Secretary—Charles Ellis.

Corresponding Secretary—Elias Durand.

Treasurer—Edward B. Garrigues.

Trustees—Edward Needles, C. H. Dingee, H. S. Fullerton, jr., J. C. Allen, Edward Roberts, Dillwyn Parrish, Wm. Biddle.

Publication Committee—D. B. Smith, Jos. Scattergood, G. B. Wood, M. D., Charles Ellis, R. E. Griffith, M. D.

June 25, 1833.—The committee on weights and measures made a report, which was laid on the table.

Willdenow's *Species Plantarum*, 10 vols., *Families of Plants*, 2 vols. and *Amœnitates Academicæ*, 10 vols., were presented to the College by D. B. Smith, E. Garrigues, G. B. Wood, Chas. Ellis, Wm. Hodgson, jr., Chas. Dingee, E. Durand, J. Scattergood &c.

Sept. 24, 1833.—The following gentlemen were duly elected Trustees. C. E. Pleasants, Peter Lehman, G. B. Wood, M. D., Wm. Hodgson, jr., Jos. Scattergood, S. F. Troth, F. R. Smith, Jacob Bigonet.

MISCELLANY.

Supplementary Communication, respecting Nomenclature. By R. HARE, M. D., *Professor of Chemistry in the University of Pennsylvania.*

In order to render more intelligible that part of my communication respecting the nomenclature of Berzelius, which relates to the double salts discovered by that great man, I send you a translation of the passage to which I referred, subjoining some additional observations.

Page 194, vol. 2, in treating of the hydrofluosilicic acid, the learned author states that, "when employed in excess, almost all the salifiable bases decompose this acid entirely, separating silicic acid, and giving rise to metallic fluorures. But when, on the contrary, no more of a base is added than the quantity necessary to saturate* the hydrofluoric acid, combinations with all the bases are obtained, analogous to double salts, resulting from a metallic fluoruret, combined with a quantity of silicated fluoride, in which the fluorine is in quantity the double of that of the fluoruret. These salts are, for the most part soluble in water, and are perfectly analogous to those produced, under like circumstances, by hydrofluoboric acid."

The salts thus mentioned, are subsequently described under names not easily translated into English. In the case of potash we have a fluorure silico potassique, or fluorure borico potassique, in the French translation. These appellations rendered in English would, I presume, be silico potassic fluoride, or borico potassic fluoride.

According to the view which I take, a salt, thus formed, (from potash,) would be called a fluosilicate (or fluoborate) of the fluoride of potassium, or more briefly a fluosilicate (or fluoborate) of potassium. For this last mentioned abbreviation ample authority is furnished in the case of oxy-salts formed of the metals proper. We designate a sulphate of an oxide, as a sulphate of the metal; as in the instance of sulphate of iron, or sulphate of copper &c.

The case of potash being given as an exemplification, it must be evident that the same terms will describe the fluosalts formed with the metal of any other base, by substituting the name of the metal, for the word potassium.

* It does not saturate this acid, but undergoes with it a reciprocal decomposition.

Ergot.—M. Boettcher, at Mendelurtz, in the duchy of Altenbourgh, believing that the different energy of various specimens of ergot might depend on the circumstance of its being collected before or after the cutting of the parent crop, obtained a quantity gathered before and after the harvest. He sent the separate products to the minister of public instruction at Berlin, who remitted them to Dr. Kluge for clinical trial at the Maternité of that city. The substance was employed on fifteen females, all well formed, and with natural presentations. The following are his comparative results:—1st. The action of the ergot of rye collected before harvest is very energetic, while that collected after harvest is totally powerless. 2d. In many cases the remedy renders the forceps unnecessary, especially when the insufficiency of uterine force depends either on real atony, or on a spasmodic contraction of the neck of the uterus. 3d. The ergot gathered before harvest arrests uterine hæmorrhage. 4th. The dose is from thirty to sixty grains, administered in portions of ten grains every ten minutes.

London Lancet, and Amer. Journ. Med. Science.

Chemical Analysis of Ergot.—In 103 parts of Ergot, Mr. Wiggers, of Berlin, has found—

White oily matter,	35.0006
Solid fatty matter, crystallizable, and of peculiar nature,	1.0456
Cerine,	0.7578
Fungous matter,	46.0862
Ergotine,	1.2466
Vegetable ozmazome,	7.7645
Sugar,	1.5530
Gummy extract, with red colouring principle,	2.3250
Vegetable albumen,	1.4800
Acid phosphate of potash,	4.4221
Phosphate of lime, and traces of iron,	0.2822
Silica,	0.1394
	<hr/>
	102.1030

There are some remarkable points in the preceding analysis. In the first place, the presence of vegetable ozmazome identifies the ergot with the class of mushrooms in which this substance forms a considerable proportion. In this ozamome seems to reside the power which promotes parturition. The ergotine is insoluble in water, and seems, from the experiments of M. Wiggers, to be the principle in which the poisonous qualities of the ergot reside. On several animals it has operated as a powerful irritant poison, while the ozmazome produced no such effect.

Lancet, and ibid.

Anthelmintic Emulsion.—Turpentine is now regarded as the most certain of our medicines for the expulsion of intestinal worms: it has been exhibited under a great diversity of forms, with a view chiefly to the modification of its nauseousness, or the increase of its specific powers: as combined in the subjoined prescription, it acts with remarkable efficiency:—

R. Infusi Sennæ,	f. 3x.
Syrupi Rhamni,	f. 3j.
Confectionis Scammoniæ,	℥ij.
Copaibæ,	℥xxx.
Olei Terebinthinæ Rectificati,	f. 3vi.

Rité misceantur ut fiat emulsio, quæ horâ matutinâ sumatur.

This is the dose for an *adult*, having no contra-indicative symptoms: the patient should take it in bed, about four or five o'clock in the morning, and afterwards endeavour to sleep.

Med. Chirurg. Rev. July, 1832, and ibid.

Aricine, Quinine, Cinchonine.—Aricine was obtained by Pelletier and Coriol from a variety of Peruvian bark. Pelletier infers from a comparison of his analysis of aricine, with the analysis of quinine and cinchonine by Liebig, that the three may be represented by three grades of oxidation of a peculiar base, composed of 20 carbon, 24 hydrogen, and 2 nitrogen. Cinchonine consisting of this base with 1 atom of oxygen, quinine of the same base, with 2 atoms of oxygen.

Ann. de Chim. et Phys. Oct. 1832, and ibid.

Phosphuretted Hydrogen.—Rose proves that the gas obtained by heating hypo-phosphorous, or phosphorous acid, and the hypo-phosphates, and which is spontaneously inflammable in the air, is a *base*. It ranks them with ammonia, as being a *basic* compound of hydrogen with a simple substance.

Ann. de Chim. et Phys. Sept. 1832, and ibid.

Sarsaparilla.—Dr. Martins states that, in Brazil, besides the *Smilax sarsaparilla*, *syphilitica* and *officinalis*, that the *glauca* is also used, also that the sarsaparilla of Vera Cruz and Tampico is the *S. sarsaparilla*; that of Honduras the *S. officinalis*; that of Para, the *S. syphilitica*. In other countries, in place of these species many others are used; thus in Malabar the *S. aspera* is employed; in other parts of India, the *Hermidermus indicus*, in some portions of South America, the *Ferriera sarsaparilla* and *stellata*; in Peru, the *Lapagena rosea* and *Luzuriaga radicans*; in Cochin China, the *Smilax perfoliata*.

Journal de Pharm.

To remove Ink Spots.—Mix one teaspoonful of burnt alum, two drachms of citric and the same quantity of oxalic acid, with half a pint of cold water; to be used by wetting a piece of muslin with it, and rubbing it on the spots.

Mirror.

True Asiatic Styrax.—Most pharmacologists refer the origin of liquid styrax to the *Liquidambar styraciflua* of North America. It was forgotten that it was formerly brought by the Arabs from eastern Asia, by way of Persia. Petiver states (*Philosophical Transactions*, No. 313,) that this odorous and pure styrax, which is employed as a perfume, under the name of *Cottu misa*, by the Turks and Arabs, is the product of the bark of a tree called *Rosa-mallos*, in the Cobros islands in the Red Sea, three days journey from the isthmus of Suz.

Rumphius (*Amboyna*, t. 2, p. 57. 60,) mentioned the tree under the name of *Lignum papuanum*, and stated that it had the foliage of an elm. It was first described in the Transactions of the Batavian Society, by Noronha, and dedicated to Governor Alting, under the name of *Altingia excelsa*. The fruit was figured by Goertner. Afterwards Koenig and Simps gave a figure of the *Rosa mala* in their annals of Botany. 1806. No. 5, p. 325. Persoon and Spengel also mention this tree under the name of *Altingia excelsa*, (*Liquidambar orientalis*. Aiton.)

There is now no doubt from the descriptions and figures published by Blume in his Flora of Java, that the *Styrax* of the east is the product of the *Liquidambar altingia*, and other allied species. The Malays call these trees by the name of *Dupa*. *Journ de Pharm.*

Muriate of morphine.—A very soluble salt, forming bunches of acicular crystals; it is best obtained by digesting excess of morphia in dilute muriatic acid, filtering the solution, and evaporating. It has a bitter taste, and is an excellent narcotic, affecting the head less than the other preparations, and scarcely possessing any exciting powers; the dose is about half a grain. Eight grains dissolved in an ounce of distilled water forms a good solution for general use. *Brande. Pharmacy*, 3d ed.

Battley's sedative solution and the black drop.—Two preparations of opium much in use; the former is less stimulant than opium, and in strength about equal to the officinal tincture; it is said to contain acetate of morphia, the resin and extractive being separated.

The black drop was originally made about 100 years ago, by Edward Runstall, of Bishop Auckland, in Durham. It has been stated by the late Dr. Armstrong and others, that it is prepared by slicing half a pound of opium, and boiling it, in conjunction with an ounce and a half of nutmeg, and half an ounce of saffron in four pounds of verjuice; then adding a quarter of a pound of honey, and two table-spoonfuls of yeast; this compound is allowed to ferment for six weeks in a warm place, after which it is decanted, filtered, and bottled, adding a little sugar to each bottle. Were this recipe correct, it is evident that the black drop would contain an acidulous acetate of morphia, which is the case, as the drop, when diluted with water, and tested by litmus, displays acid properties: it is affected by most of the usual tests of opium, and indicates the presence of

morphia by nitric acid and permuriate of iron. The nature of this preparation is, however, unknown. It is much more powerful as a narcotic than the officinal tincture, three drops of which are only equal to one drop of the black drop. *Ibid.*

Expeditious manner of dissolving Amber and Copal.—After numerous trials I have at length succeeded in making a saturated solution of amber and copal in spirits of wine and oil of turpentine, without the addition of any foreign substances. I have tried the methods described by Tingry, Varley &c., but with common turpentine they will not succeed. Tingry's requires no less a period than six months. The plan I pursue is as follows—take a piece of glass tube about four inches long, one-half inch in diameter, and one-tenth inch thick; close up one end then introduce a few small pieces of amber or copal, and fill the tube about half full of alcohol, specific gravity .790 (I have not tried a weaker spirit;) close now the upper end with the blow-pipe, and hold it, by means of a wire twisted round it, over a clear fire. The spirit will presently disappear, and the tube be filled with a dense vapour; it may then be removed from the fire, when the vapours will be seen to condense all at once into a colourless fluid, which will turn yellow as it cools. When copal is operated upon, it appears quite opaque when the tube is full of vapour, but recovers its transparency as it cools. When the tubes are opened there is no escape of elastic fluid, and if the solutions are poured on a plate of warm glass they will flow into beautiful transparent varnishes. The amber will, no doubt, form an excellent varnish for electrical purposes. When oil of turpentine is used, it appears to expand so as nearly to fill the tube; when poured out it was nearly colourless, and dried almost as fast as spirit varnish. I need scarcely add, that the hand should be protected by a glove, and the face with a plate of glass, or a board with a hole in the centre. To make varnish in the large way, a Papin's digester should be used, and the heat may be regulated by laying the amber, or copal, on the cover; when they melt, the heat may be judged high enough, as copal applied to the outside of the tube readily melted after it had been removed from the fire some time.

G. DAKIN.

Mechanics' Magazine.

Plant furnishing Gum Ammoniac.—We have already noticed that Mr. Don had discovered the plant furnishing the gum ammoniac, (*Journal Philad. Colleg. Pharm.*) Since then he has published a description of this plant in the *Philosophical Journal*, No. 49, as follows:—

Dorema.—Discus epigynus cyathiformis. Achenia compressa, marginata: costis tribus intermediis distinctis, filiformibus. Vallecule univittatæ. Commissura quadri-vittata. Herba persica, robusta, facie fere opopanax. Folia ampla, sub-bipinnata. Umbella prolifera, subracemosa. Umbellulæ globosæ, breviter pedunculatæ. Flores sessiles, lanugini submersi.

Prussic Acid a Poison for Vegetables.—The sensitive plant, when exposed to the vapour of prussic acid, instantly closes its leaves. The same plant, as well as other tender plants, such as the garden pea and kidney bean, when subjected to the influence of this acid, quickly wither and die, and laurel water has the same effect on them. It appears also that plants which naturally contain the acid, as the cherry, laurel and almond, are not less susceptible of its poisonous action than others. Seeds steeped in the acid lose their power of germination.

Gazette of Health.

Citrine Ointment.—M. Cedié is of opinion that in recently prepared citrine ointment the mercury is in the state of a proto-nitrate, whilst it exists in a metallic form, in that which has been made for a long time. He has established this by treating the ointment with cold sulphuric ether. In the first case, he obtained a white powder bearing all the properties of the proto-nitrate of mercury, and in the latter, a gray powder which was mercury in a state of great division. He admits that the deuto-nitrate of mercury, used in the preparation of citrine ointment, is first changed to proto-nitrate by the oxygenizing action of the grease, and that this action continuing, the salt is finally reduced to the metallic state. The second effect, according to M. Cedié, is accompanied by a disengagement of nitrous gas; he founds this belief on the destruction of the writing on a label placed in a vessel containing citrine ointment. He justly observes, that the action of recent and old ointment cannot be identical, and requests the attention of practitioners to this point.

Journ. de Pharmacie.

Vegetable Yellows.—It is a curious fact that animal and vegetable yellows are more permanent than any other colours. The yellow of the petals of flowers is the only colour which is not discharged by the fumes of sulphurous acid. If a lighted match be held under a flower of the heart's-ease, (*Viola tricolor*) for instance, the purple tints will disappear, but the yellow will remain unchanged.

Field. Naturalist's Mag.

Oil of Digitalis.—The powder of the dried leaves is to be introduced into a glass retort, to which a tubulated receiver is connected by means of an adopter; a second receiver, containing alcohol or ether, is attached to the first by a bent tube. Heat is to be applied to the retort, by means of a sand bath, which can be raised to a red heat if requisite. The first product of the distillation is an aqueous fluid of a light yellow colour and virose smell; as the heat increases, the oil begins to be formed, it is at first yellow, but gradually becomes darker. Towards the end of the process, a considerable quantity of carbonate of ammonia is formed, and collects in a cool part of the apparatus. During the whole course of the operation, a dense, pungent smoke, consisting of the oil in the form of va-

pour, is evolved, the greater portion of which is absorbed by the alcohol or ether in the receiver. This is of some moment, as the fumes, even when much diluted, and inhaled for but a short time, cause *vertigo*, *nausea*, and headach. The empyreumatic oil possesses the following characters; it is semi-solid at 60° F., and melts at about 120°; of a dark brown, by reflected, and of a reddish colour by transmitted light; of a pungent, biting, disagreeable taste; causing an increased secretion of saliva. Its odour is nauseous, resembling that of a tobacco pipe which has been long in use; when shaken with water, it imparts to it the peculiar taste and smell, and renders it turbid. When heated with dilute acids, a portion is dissolved, and a solution of a reddish brown colour, and of the characteristic odour and taste, results. Alkalies, when aided by heat, readily act upon it, throwing down a dirty white precipitate, which, on exposure to the air, becomes brown and resinous looking. In this state, it is soluble in acids and in alcohol, and is precipitated from its solutions in the former, on the addition of an alkali. Boiling alcohol and ether dissolve the oil with great facility, and form transparent solutions of deep brown colour; on cooling, a flocculent precipitate falls; when this is examined under the microscope, it is found to consist of two substances, one crystalline, the other globular. If the solutions be allowed to evaporate spontaneously, the crystals may be distinguished by the naked eye, and the globules are quite distinct; that portion which imparts the colour to the solutions, gradually thickens and becomes of the consistence of extract. Strong nitric acid converts the oil into a substance bearing some resemblance to artificial musk, both in appearance and odour. The watery fluid which comes over with the oil is strongly alkaline, and effervesces with acids, from the quantity of carbonate of ammonia contained in it. Its colour undergoes several curious changes; but I have not yet investigated this part of the subject.

When a solution, prepared by agitating the oil with dilute acetic acid slightly warmed, is neutralized with potass and distilled, an opaque white fluid passes over; it is extremely acrid, and when applied to the tongue causes a copious flow of saliva; it is alkaline, and when neutralized by acetic acid, and evaporated at a heat not exceeding 140° F., small acicular crystals, of an intensely acrid taste are formed.* When an alkali is added to a transparent solution of these crystals, a cloudiness is produced, and after standing for some time, a precipitate is found adhering to the glass; this is soluble in alcohol, ether, and the acids. When muriatic acid is added to the distilled liquid, the milkiness is immediately destroyed, and the solution becomes of a transparent red.

Morries, in Edinburgh Med. and Sur. Jour.

* On turning over the article "Distillation Sèche," in Berzelius' Chemistry, I found that Reichenbach had described similar substances as existing in empyreumatic vegetable oils; the crystals correspond to his *Paraffine*, the globules to *Eupion*, and the dark coloured matter to *Pyretine*.—Berzelius, *Traité de Chimie*, vi. 636.

Preparation of pure nitrate of silver; by M. Bradenburgh.—Dissolve in nitric acid the common alloy of silver and copper. Evaporate to dryness, and heat the salt in an iron spoon till it ceases to boil. Dissolve, then, a very small portion in water, and try it with ammonia to see if any copper remains. If there is, heat it again a few seconds, and make a new trial: as soon as the nitrate of copper is decomposed, pour it on an oiled plate, or dilute the mass in water, and filter it to separate the deutoxide of copper set free by the decomposition of the nitrate.

Amer. Journ. of Science and Arts.

Decomposition of the chloride of silver in the moist way.—Take a small zinc or cast iron pot; put the chloride into it, in pieces, and cover it about an inch with water. If the zinc or iron be perfectly clean, the decomposition goes on pretty rapidly of itself, but if not entirely clean and fresh, it may be slow, and in that case, a little muriatic or sulphuric acid must be added. This addition is, besides, necessary for washing the silver and having it pure. The operation is rapid and curious to observe. The reduction penetrates from the surface to the centre. The temperature rises, if the mass be considerable, and contributes to accelerate the operation. It may, if too weak, be aided by artificial heat.

The chloride of silver may be reduced also by heating it with a mixture of lime and charcoal in the following proportions:—

Chloride of silver,	100.
Dry quick lime,	19.8
Charcoal,	4.2

But to prevent loss the chloride must be in powder.

Ibid.

Action of ether on sulphate of indigo; by M. Cassola.—If one part of indigo be dissolved in four parts of sulphuric acid, and diluted with twenty parts of water and an equal quantity of sulphuric ether be added, the liquid becomes discoloured in about half an hour, if it is kept constantly at a temperature of 100° F. in a well stopped bottle. The blue colour cannot be restored by oxygen, or metallic oxides.

Kartsner, Arch. t. 16, p. 126, and ibid.

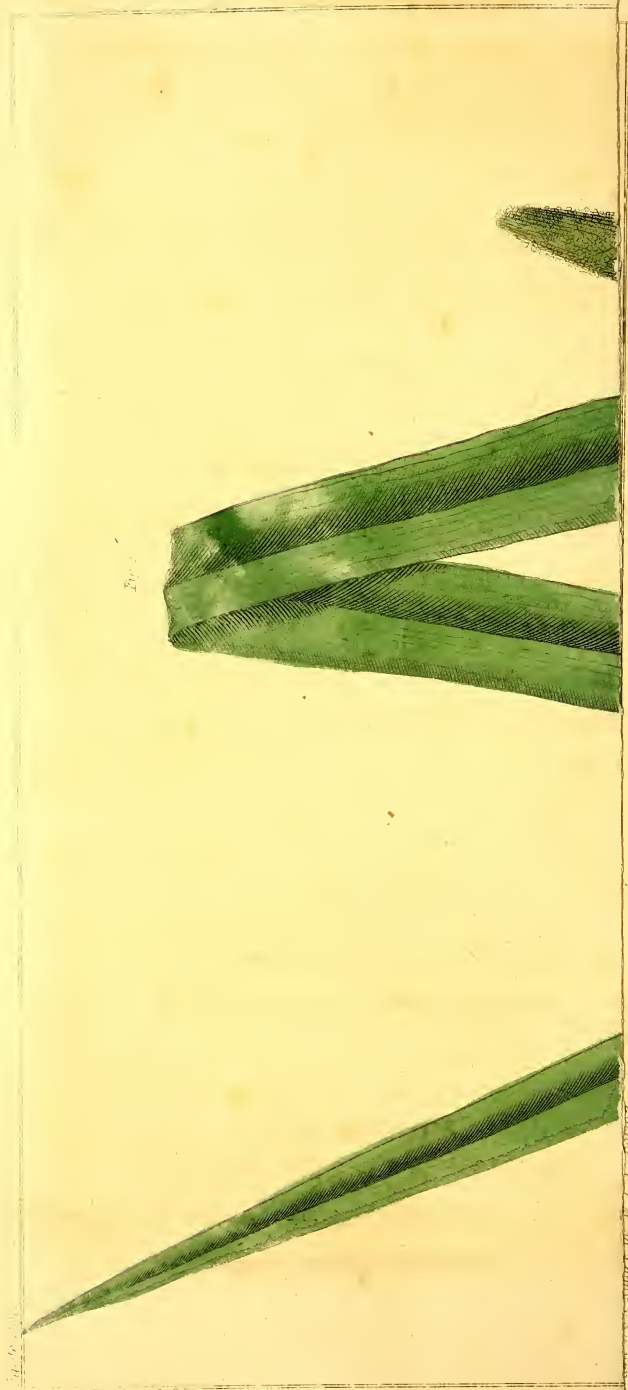
To test the purity of chromate of potash; by Z. Zuber.—Add to a solution of the chromate, a great excess of tartaric acid. The fluid acquires, in about ten minutes, a deep amethystine colour, and gives no precipitate, either by nitrate of barytes or nitrate of silver, when pure; but, however small the quantity of sulphate or muriate, it may contain, it is rendered turbid by the addition of barytic or silver salts.

Bul. de Mulh. No. 6, p. 58, and ibid.



ACORUS CALAMUS

(See a Ping Calamus.)



Wm. Woodbury & Co.

ACORUS CALAMUS.

(Sweet Flag, Calamus.)

Wm. Woodbury & Co.

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ORIGINAL COMMUNICATIONS.

ART. XLIV.—*On Acorus Calamus*.—By R. EGLESFELD
GRIFFITH, M. D.

Nat. Ord. AROIDEÆ.

Sex. Syst. HEXANDRIA MONOGYNIA.

ACORUS. *Spadix* cylindric, covered with florets. *Corolla* six-petalled, naked. *Style* none; stigma a mere prominent point. *Capsule* three-celled, three-seeded.—*Nuttall*.

A. calamus. Leaves and stems ensiform. *Spadix* cylindric, obtuse, solitary oblique, protruding from the side of an ensiform leave-like scape. *Capsules* three-celled, many-seeded.

Synon. *Typha aromatica*, *clava rugosa*. Morrison.

Acorum legitimum. Tabermontanus.

Acorus indicus. Geoffroy, v. ii. p. 5.

A. asiaticus. Dale, 259.

A. calamus. Lin. Sp. pl. Pursh. Fl. Am. Sep. 1, 235. Bigelow, Flor. Bost. 83. Beck, Bot. North and Mid. States, 381.

Bart. Com. Flor. Phil. i. 169.

Icon. Rheede. Hort. Malabar. vol. ii. t. 60. Smith, English Botany, 356. Barton, Med. Bot. vol. ii. t. 30 &c.

Common names. Calamus. Sweet flag. Flag root. Sweet root &c.

Pharm. Acori Calami *Radix*. EDIN. Calami *Radix*. LOND. U. S. Acori *Radix*. DUB.

Offic. Root. Somewhat flattened, externally wrinkled, of a yellowish brown colour, having on its under surface, numerous small circular spots. Internally, whitish, or yellowish. Texture light and spongy. Odour strong and fragrant. Taste warm, bitterish, pungent aromatic.

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A

Description.—Root perennial, horizontal, rugose, jointed, somewhat compressed, from half an inch to an inch in thickness, and from six inches to two feet in length, furnished on the lower side with numerous fibres. The joints are from half an inch to an inch in length, and are variously shaded with different shades of red, white and pungent. From the joints proceed bunches of hairlike brown fibres. Internally the root is white and spongy, and has a peculiarly aromatic and spongy smell. The taste is aromatic, penetrating and even acrid. The leaves are all radical, sheathing at the base, of a red colour below and green above; they are long, flat and sword shaped. The scape is similar to the leaves, but is generally longer, and bears about its middle a spadix or spike of flowers. This is solitary, oblique and cylindrical, from an inch to three inches in length, and attenuated towards its ends with an obtuse termination. The flowers are small, and arranged in a spiral form, they are of a greenish colour, and consist of six equal truncated petals, without an enclosing calyx; the stamens are generally six in number, the filaments are thick, and the anthers bilobate. The germ is sessile and gibbous, crowned by a pointed stigma. Capsule oblong, containing numerous minute seeds.

Habitat. The *A. calamus* is found in most parts of the world, on the margins of small streams, generally in company with the blue flag and the cattail. It, however, is also found in other wet places, low meadows, swamps &c. It is never cultivated, as it is extremely abundant. It flowers in May or June.

Bot. History. The term *ACORUS* is derived from the Greek, and alludes to a belief that it was possessed of curative powers in diseases of the eye. There appear to be but two species, that under consideration, and the *A. gramineus*, a native of China, which has narrow leaves, and the spadix nearly terminal. The *A. calamus*, however, presents some differences, according to the country in which it grows, but they do not appear of sufficient importance to warrant a separation into distinct species; added to which, their mode of growth and sensible properties are perfectly identical.

Med. History. Although the name of *CALAMUS aromaticus* has been applied to this plant, under the idea that it was the same as the remedial agent spoken of by the ancients under that appellation, there is but little or no ground for the supposition. From the descriptions of this medicine given by Theophrastus, Galen, Pliny and others, it would appear that it consisted of reddish, knotty stems and roots, which were easily broken, filled with a pith, viscous on being chewed, and of a bitter astringent taste. The plant furnishing them perfumed the air around the places in which it grew. It was said to be a native of India, Arabia &c. As, however, there have been no figures of it handed down to us, it is impossible to decide with any certainty on the true character of the plant, and the confusion has been added to in no slight degree, by the fact that the *Acorus calamus* was, at a very early period after the revival of science, assumed to be the species spoken of by the more ancient writers, and was substituted for it in the treatment of the diseases for which it was recommended. It would be a waste of time to examine all the various theories that have been promulgated; some of the most striking, and which are sanctioned by high authority, will amply suffice to show the complete uncertainty that exists on the subject. Matthioli, in his commentaries on Dioscorides, whilst admitting the true calamus was unknown, gives a representation of what he supposes it would be found to be; this imaginary plant is, likewise, admitted by Bauhin in his *Pinax*. The celebrated Clurius first figured the *Acorus calamus* as the true plant in his *Plant. Rar.* lib. ii. p. 230, but afterwards, in an edition of Garcías, which he prepared for the press, retracted his former opinion, and replaced this design by another, representing an umbelliferous plant. In 1640, Prosper Albinus, in *Plantæ Exoticæ*, gave the figure of a plant from Egypt, which he termed *Cassal al darira*, and says it resembles a *Lysimachia*; and Lemery in his *Dict. des Drogues*, judging from his description, has assumed the same plant as the true calamus. Linnæus refers it to his *ANDROPOGON nardus*; and finally, Guibourt has endeavoured to show that it is identical with the *GENTIANA chirayita*. Merat and

Delens, in their excellent Dictionary of *Materia Medica*, from which the above is condensed, are inclined to believe that it is the variety of the *ACORUS calamus*, occurring on the Malabar coast, and figured by Rheede, (*Hort. Malabar*, t. ii. 48,) under the name of *vaambu*. Be this as it may, we now find in commerce nothing but the roots of the *A. calamus* and its varieties.

Medical properties and uses.—The root, which is the part used, is a warm and aromatic stimulant, and enters into the composition of several pharmaceutical preparations. It forms either alone in infusion, or in combination with other articles, an excellent excitant in windy colic, in dyspepsia and other deranged states of the gastric organs. Dr. Barton states that in such cases he has been eminently successful with it, and also recommends it to be chewed by dyspeptic persons, and the juice swallowed, to relieve that torpor of the stomach so common to those affected with that disease, and which leads too many of them to a constant use of alcoholic stimulants. Dr. Thomson says, from his own experience, it is one of the best adjuvants to bark and quinine in intermittents, and that it has been used alone successfully in this disease. In India it is a favourite remedy, and Ainslie informs us, that it is reckoned so valuable in indigestion and bowel affections of children that there is a penalty incurred by any druggist who will not open his door in the middle of the night and sell it if demanded. The Arabians and Persians consider it as a powerful aphrodisiac and carminative. The Turks candy the roots and regard them as a preservative against contagion. It, however, is little used in this country, though it presents far more claims than numbers of other stimulants of foreign origin; but in medicine, unfortunately, few articles that are within the reach of all, from their cheapness and plenty, are considered to possess powerful remedial virtues, whilst the utmost confidence is placed in those which are expensive and derived from a foreign source.

Pharm. preparations and mode of administration. It may be given in substance in the form of powder in intermittents, in doses of ℥i. to ℥i., or in infusion (℥vi of the bruised root

to ℥xii of boiling water) to the extent of a teacup full twice daily. When used for the flatulent colic of infants it is best combined with magnesia and chalk. It enters in a variety of the compound medicines of the foreign pharmacopœias, as the mithridate, orvietan, theriac &c. It should never be prescribed in decoction, as this mode of preparation dissipates the volatile oil, in which the virtues of the plant appear to reside.

Analysis.—From an examination of this plant by Tromsdorff, (Ann. de Chim. tom. xviii.) it appears that sixty-four ounces of the fresh root afforded him fifteen grains of volatile oil, ℥i. of inulin, ℥iii. of gum, ℥iss. of viscid resin, ℥xii. 3vi. ligneous fibre, ℥ix. of extractive matter, and ℥xvii. of water. Mr. Gray obtained 29 oz. of the volatile oil from 7 cwt. 23 lbs. of the roots. This oil, it is stated by Dr. Thompson, (*Mat. Med.* 1.) differs from most of the other volatile oils in some particulars; it does not dissolve iodine; it instantly decomposes sulphuric acid, but is slowly acted upon by the nitric. It is lighter than water, of a pale yellow colour, and possesses the odour and pungency of the plant in an eminent degree.

Economical uses.—According to Bechstein, the leaves may be employed to protect woollen clothes from moths, and books from the ravages of worms. The plant has also been used for tanning leather. In this country it is extensively used in the preparation of wine bitters. Neither horses, cows, sheep, or hogs will eat any part of this plant. The best time to collect the roots is in the autumn. The only preparation they require is a careful washing, removal of the fibres and drying. They are often presented for sale with the whole of the epidermis removed; this, though it improves their appearance, deteriorates them, as the greater proportion of the active principle is thus destroyed.

ART. XLV.—*Note on James' Powder.* By J. R. COXE, M.D.
Professor of Materia Medica &c. in the University of Pennsylvania.

THE virtues of James' Powder have been so long established by multiplied experience in every quarter of the globe, that it is not surprising that a succedaneum for it should have been many years ago presented to the public, by the British pharmacopœias, under the modified names of *Pulvis antimonialis*, by the London and Dublin Colleges; of the *Oxidum antimonii cum phosphate calcis*, by the College of Edinburgh. Little difference exists in the formulæ of those respective places; being founded principally on the analysis of James' powder, by Dr. Pearson, who constructed the formula that is presented by them, and which was followed by the United States Pharmacopœia of 1820, and by that of New York in 1830—whilst it is totally rejected by the Philadelphia Pharmacopœia of the same year.

I believe the *real* formula of James' powder was never given to the public, although a prescription for it appears under the sanction of an oath in the patent-office of England! The analysis given by Dr. Pearson of this celebrated nostrum makes it to consist of 43 parts of phosphate of lime, and 57 of oxide of antimony. Subsequently to this, appeared another, by M. Pully, of Naples, communicated in the 65th volume of the *Ann. de Chimie*, who observes that Pearson's analysis will not enable any one to imitate this celebrated compound; and, in fact, it has been generally conceded, that, although the *pulvis antimonialis* may in all probability be essentially the same with James' powder, yet there is a considerable difference in respect to their doses. At one time it was imagined that the *pulvis antimonialis* was nearly double the strength of its celebrated original; whilst more lately the former has been affirmed to be possessed of little or no value. Such discrepancy of opinion can only be explained, by a presumed diversity in the preparations, arising from imperfect analysis; for, even as respects the James' powder itself, we find *two persons* professing to pre-

pare it in London, and each asserting to be the only proprietor of the genuine receipt! Pully differs greatly from Pearson in the analysis he has afforded—this last stating, as above mentioned, that it consists of 43 parts of phosphate of lime, and 57 oxide of antimony; the former, as composed of 37 parts of protoxide of antimony, 21 phosphate of lime, 24 sulphate of potash, and 18 of potassa combined with protoxide of antimony! Such diversity in the analyses tends to throw suspicion on them both; and as the original formula of Pearson seems itself to have undergone considerable modification by doubling the proportion of the hartshorn shavings, it can scarcely be wondered at, that much diversity should prevail as to the real character of this article, in a remedial point of view. Perhaps it may however be explained by recollecting that almost, if not all, the active preparations of antimony contain the *protoxide*, whilst the plan of proceeding in both Pearson's and Pully's formula tends greatly to convert it into the *peroxide*, in which state, it is comparatively inactive. As it may chance to be prepared, it may therefore happen that it may occasionally possess more or less of either of these oxides, and thus appear of various activity at different times. Presuming that all except the oxide of antimony is really useless or inert in the preparation, it is probable that all that we anticipate from either James' powder, or from the pulvis antimoniæ might be obtained from the protoxide alone, and nearly such a plan was at one time proposed in the Philosophical Transactions, by Mr. Chenevix. "Dissolve," says he, "together or separately, in the least possible portion of muriatic acid, equal parts of the white oxide of antimony (formerly called Algaroth's powder,)—a protoxide—and of phosphate of lime. Pour this solution gradually into distilled water, previously alkalized by a sufficient quantity of ammonia; a white and abundant precipitate will take place, which well washed and dried, is the substitute I propose for Dr. James' powder."

In order to facilitate this plan of Chenevix, and establish an undoubted uniformity in the preparation, I have long since recommended the obtaining the phosphate of lime by preci-

pitation from the muriate, through the addition of phosphate of soda. This, well washed, affords a phosphate of lime, unequalled in purity; whilst the pulvis Algarothi, slightly washed with a weak solution of ammonia, will be as perfect a protoxide as can well be prepared. Unable to say with confidence which analysis, (that of Pearson or of Pully) is most to be relied on, it would be injudicious to recommend the proportions they individually mention, as being either superior to the other; I have made up the article by both proportions, and have found them efficient, so as scarcely to give a preference. A better proportion is, however, I think, to be found by taking *equal parts* of phosphate of lime and protoxide of antimony. So far as regards its activity, I think it approaches nearer to that of James' powder than when formed by either the process of Pearson or Pully; but if, as I have above stated, the very heirs of James pursue a different mode of preparation, we cannot wonder at the difference of opinion that has prevailed in relation to the powder itself, or the substitutes that have been adopted.

It is very desirable that the real merits of this powder should be shown, for although I consider it as having been at one time too highly praised, I cannot believe it to be so utterly devoid of utility as has latterly been supposed.

ART. XLVI.—*On Poisoning with the Preparations of Chrome.*

By T. J. DUCATEL, M. D. Professor of Medical and Pharmaceutical Chemistry, University of Maryland.

Communicated by the Author.

DR. CHRISTISON, in his elaborate Treatise on Poisons, has furnished us with full accounts of the toxical properties of most of the substances used as remedial agents, and of such as are employed in the arts. There are but few chapters in that excellent treatise to which more recent discoveries have as yet added any thing of importance; and the least satisfactory of its sections, perhaps, is that which relates to the properties of the chemical preparations of chromium. In reference to these, nevertheless, and in the short notice which is taken of

them, the principal facts connected with their natural history as poisons are mentioned. Our intention, therefore, is solely to consign a few additional facts to this history, relating as it does to substances produced on a large scale in our immediate vicinity, extensively used in the arts of painting and dying; and the noxious qualities of which, though sufficiently familiar to some, to have been already resorted to for criminal purposes, seem not so generally known to medical practitioners, as the latter circumstance now renders it necessary that they should become.

Chromium is arranged by Dr. C. in his third order of the irritant class of poisons, which includes the compounds of the metals. It is associated with tin, silver, gold, bismuth and zinc, and their effects it is said, are "passed over shortly; because they are little known as poisons, and it is therefore only necessary that their existence and leading properties be mentioned." But circumstances to which we have just alluded, require that greater interest should be attached to the metal now under consideration; and that every ascertained fact relating to the physiological and pathological action of its preparations, considered as toxic agents, should be systematically laid down. In attempting to do this, we shall follow Dr. Christison's method, when treating of the other metallic poisons regarded as of more importance, namely, arsenic, mercury &c., commencing with a brief account of so much of the chemical history of the preparations of chromium, as it is necessary for every medical man to know.

Of the Chemical History and Tests for the Preparations of Chromium.

Chromium is with difficulty obtained in its pure state. It is a white metal, brittle, and very infusible. With oxygen, it forms two definite compounds—the green oxide, and chromic acid.

The proto, or green oxide,* of chromium is insoluble in

*The *chrome green* of commerce is a different article. This is a mechanical mixture of chrome yellow and Prussian blue, with occasionally an additional admixture of whiting.

water: it is nearly infusible, and when strongly heated resists the action of the most powerful acids. It is a salifiable base, the salts of which, when in a solution, may be distinguished by the following characters. The solution has usually a dark green colour. Ammonia, and an infusion of nutgalls throw down a green precipitate. Potassa does so likewise, but the precipitate is redissolved by an excess of the alkali. This protoxide of chromium is used in the arts for painting upon porcelain.

Chromic acid is characterised by its colour, which is a dark ruby red. It is very soluble in water and in alcohol. The solution is partially decomposed by heat, and when boiled with sugar, starch, and other organic principles, the acid is converted into the protoxide. The coloured salts which the chromic acid forms with the alkaline bases, are extensively used in the arts. The chief of these are the chromates of lead and of potassa. These salts are in general sufficiently characterised by their colour, which is either yellow or red, the latter colour predominating whenever the acid is in excess: but they may be chemically distinguished by the following test:—"On boiling a chromate in muriatic acid mixed with alcohol, the chromic acid is at first set free, and is then decomposed, a green muriate of the oxide of chromium being generated."*

The chromate of lead is composed of one equivalent of acid, and one equivalent of the protoxide of lead. It occurs in commerce of various shades of yellow, according as the liquor with which it has been prepared was more or less acid. It is used as a pigment under the name of *chrome yellow*; and has also been reprehensibly employed by confectioners for colouring sugar plums. Confects suspected of being rendered poisonous in this way, are easily tested by digesting them in distilled water, which dissolves the saccharine and various extractive matters, entering into their composition, and leaves untouched the colouring ingredient. When the solution is thoroughly effected, it should be carefully decanted, and the

* Dr. Turner's Elements of Chemistry.

residue repeatedly washed, then dried on a stove. If it consist of chromate of lead it will, when mixed with a little carbonate of potassa, and exposed to heat in a small crucible, be decomposed, forming an insoluble carbonate of lead, and a soluble chromate of potassa. A solution of the latter in water will yield a yellow precipitate on the addition of a small quantity of a solution of acetate of lead, and a red precipitate with a solution of nitrate of mercury.*

A dichromate of lead is sometimes prepared, which consists of one equivalent of chromic acid, and two equivalents of protoxide of lead. It is a beautiful red colour and has likewise been employed as a pigment.

Chromate of potassa—the neutral chromate—consists of one equivalent of acid and one of potassa. It occurs in commerce in small prismatic crystals of a lemon, yellow colour: it is soluble in water, but *insoluble* in alcohol.

Bichromate of potassa crystallizes in rectangular or square prisms, of a beautiful red colour: it is soluble in about ten times its weight of water at sixty degrees, and the solution has an acid reaction: it is insoluble in alcohol. This salt and the preceding are used in dying.

Of the Physiological and Pathological Action of Chromium and its Preparations.

Chromium in its pure state, like all other metals, doubtless exerts no influence on the animal economy.

A solution of the salts of the protoxide of chromium has a peculiar taste which is strong, but rather agreeably sweet. The salts of this genus are probably poisonous; but their properties, in this respect, have not been investigated.

Chromic acid possesses an intensely sour taste, with a considerable degree of astringency: it stains the skin yellow, and the stain cannot be removed by water, but requires the agency of an alkali. Should there be any abrasion of the cuticle, a painful ulcer will be produced. It is no doubt to the free acid

* We have reason to believe that the mixed article—*chrome green*—mentioned in a previous note, is also employed as a colouring material by confectioners. Although not so injurious as the *chrome yellow*, its use is improper.

present in the vats of dyers who use the bichromate of potassa, that we are to ascribe the troublesome sores with which Dr. Duncan first reported the workmen of Glasgow to be attacked. These sores are represented as gradually extending deeper and deeper, without spreading, till they sometimes actually make their way through the arm or hand altogether.* This singular effect of a strong solution of bichromate of potassa, is well known in this city, where the article is manufactured in large quantities. Dr. M. Baer informs us that he has observed it in above twenty cases. Whenever there was the slightest injury of the skin, the solution would produce a painful burrowing ulcer, which continued in spite of all treatment, even so as to penetrate the limb, unless the workman was promptly removed from the room in which the substance is manufactured. Dr. B. further remarks, that he has seen ulcers situated on parts of the body, where he is sure the solution did not come in contact. He thinks it probable, that these were produced by vapours charged with chromic acid. On the other hand, the most concentrated form of the solution made no impression upon parts where the cuticle was in a state of integrity. There is no question but that chromic acid taken into the stomach, will occasion all the violent irritating and corrosive effects of other mineral acids, and give rise to the same inflammatory symptoms by which the action of these is characterized.

The chromates of lead may be considered as doubly poisonous by their radical and base.

The neutral chromate of potassa, when swallowed will probably cause inflammation, but perhaps not of a violent kind.

The bichromate of potassa is the most interesting of the salts of chromium, in a toxicological point of view. Its effects on the animal economy have been experimentally investigated by *Gmelin*. The results of these experiments are stated by Dr. Christison as follows:—"He found that in the dose of a grain the *chromate* of *potassa* (bichromate of potassa) has no effect when injected into the jugular vein of a dog,—that four

* Dr. Christison's Treatise.

grains produced constant vomiting, and death in six days, without any other striking symptom,—and that ten grains caused instant death by paralysing the heart. Its effects, when introduced under the skin, are still more remarkable. It seems to cause general inflammation of the lining membrane of the air passages. When a drachm was thrust in the state of powder under the skin of the neck of a dog, the first symptoms were weariness and a disinclination to eat. But on the second day the animal vomited, and a purulent matter was discharged from the eyes. On the third day it became palsied in the hind legs; on the fourth it could not breathe or swallow but with great difficulty; and on the sixth it died. The wound was not much inflamed; but the larynx, bronchiæ, and minute ramifications of the air tubes, contained fragments of fibrinous effusion, the nostrils were full of similar matter, and the conjunctiva of the eyes were covered with mucus. In another dog an eruption appeared on the back, and the hair fell off.” It is elsewhere* remarked, in general terms, of this salt, that its action on the animal economy determines convulsions, and palsy; and that it seems to occasion death by paralysing the nervous system. A strong analogy will be perceived in the above account of the action of bichromate of potassa, to one of the varieties of poisoning with arsenic.

Several fatal cases of poisoning with the saturated liquor of the bichromate of potassa, have occurred in this city. The following has been communicated by Dr. Baer:—A labourer, aged thirty-five years, on attempting to draw off from a refiner a solution of the bichromate of potassa, in the effort to exhaust the syphon by suction, received a small quantity of the solution in his mouth. His first impression was that he had spit out; but only a few minutes elapsed before he was seized with great heat in the throat and stomach, and violent vomiting of blood and mucus. The vomiting continued until shortly before his death, which took place about five hours after the accident.

* *Journal de Chimie Medicale.*

What has now been said of the bichromate of potassa, is equally applicable to the bichromate of soda, a preparation, however, which is seldom met with out of the laboratory.

Of the Morbid Appearances caused by Poisoning with the preparations of Chromium.

The morbid appearances in the body of the individual, whose case is furnished by Dr. B., were the following:—The mucous tissues of the stomach, duodenum, and about one-fifth of the jejunum, were found destroyed in patches. The remaining parts could be easily removed with the handle of the scalpel. The lower part of the intestinal tube appeared to be healthy.

The post mortem examination of a dog, killed fifteen minutes after taking a second dose of a strong solution of the bichromate, which caused violent vomiting, exhibited the mucous tissues from the mouth throughout the whole of the primæ viæ very much thickened, and in a high degree of inflammation. At the greater curvature of the stomach immediately opposite to the cardiac orifice, the mucous membrane was gangrenous, and easily wiped off with the fingers. The muscular and peritoneal coats were also much injected.

Of the Treatment of Poisoning with the preparations of Chromium.

The chemical treatment of poisoning with the bichromates—the bichromate of potassa, and the bichromate of soda—consists in administering a solution of carbonate of potassa or soda, (the latter in preference,) thereby neutralizing the excess of acid to which the injury may be mainly ascribed. The subsequent inflammation is to be treated on general principles.

One juridical case has come within our knowledge, being on the charge of an attempt to poison by mixing bichromate of potassa with the whiskey of a dram drinker, in which the accused was acquitted chiefly in consequence of the uncertainty manifested by the medical witnesses as to the real properties of this now well ascertained, virulent poison. It is

this circumstance which has induced us to collect for publication, whatever appeared to be satisfactorily known of the toxical qualities of the salts of chromium.

Baltimore, Aug. 24th, 1833.

ART. XLVII.—*On the proposed method of Analysing Mineral Waters by Alcohol.* By HENRY D. ROGERS.

CHEMISTS have long been aware of the peculiar uncertainty attending the analysis of mineral waters; an uncertainty proceeding not from any difficulty in detecting and ascertaining their ultimate ingredients, but from that of conjecturing with any absolute accuracy the particular combination in which they present themselves, when thus held in solution in the water of a spring, which in many cases contains a great variety of substances.

It is true, that the same kind of embarrassment arises when the chemist undertakes to compute the manner in which the constituents of any complex compound whatever, are associated, and always, for the same reason, that in separating substances by analysis we must employ agents, and these agents may operate, and indeed they confessedly do oftentimes operate, *to generate* a particular combination of the elements, differing widely from any previous state of union that existed in the body analyzed.

That this is especially the case in organic analysis, where the variety of combinations possible in the elements is so multifarious, there can be no doubt, else how can we account for the ten or more distinct products recently derived from opium, for example. And this is one reason why it is so necessary to know the methods adopted in every case by the experimenter, as each inquirer, by pursuing his own plan, may develop results which will not be found to harmonize with those of others, and thus be productive of much perplexity. Hence arises the necessity of deducing our opinion of the true state of combination in a compound, in so great a degree from indirect

reasoning, leaving the door open to a variety of conjecturings, of which we have a strong instance in point in the case of alum, the common double sulphate of alumina and potassa, in which **BERZELIUS** represents the ingredients to be thus united ($\ddot{A}i + 3 \ddot{S}$) + $\dot{P}o + \ddot{S}$) + 24 Aq.—or 2 of alumina and 3 of sulphuric acid, united to 1 of potassa and 1 of sulphuric acid; while **Phillips** arranges it thus: ($\ddot{A}i + 2 \ddot{S}$) + ($\dot{P}o + 2 \ddot{S}$) taking one equivalent of acid from the alumina and giving it to the potassa.

It was from such reflections that I was induced to repeat some of **Mr. Cohen's** leading experiments in strict accordance with his detail of them, both as to order and manner, and if after these precautions, a discrepancy between our results is the consequence, I can only request that your chemical readers will institute a few of the experiments for themselves in order that they may judge of the causes of this variance in our conclusion.

At the same time I do not imagine that it can be a matter of much moment, however interesting it may be in a chemical point of view, to ascertain the true mode of arrangement; for in those cases where we desire to imitate a natural mineral water, it is easily effected by mingling the elements in a soluble form in the proportions indicated by analysis.

But it must be observed, that it by no means follows that we can command the same means of effecting certain combinations as are at the disposal of nature, and therefore that although we may apparently place together the same substances, we may entirely fail in developing the peculiar properties by means of which they sometimes act so energetically on the system. Many mineral waters come from great depths, and all their phenomena indicate that they are occasionally subject to immense compression. Now of the circumstances of chemical combination under pressure we know nothing, and at the same time are equally ignorant of the great advantage possessed by nature, in bringing elements together in the bowels of the earth in that state which chemists call *nascent*. When, for instance, we advert to the amazing quantity of that ordinarily insoluble body, silica,

held in solution in the hot springs of Iceland, and the inexplicable presence of nitrogen in nearly all the thermal waters in the world, we are obliged to confess our incapacity to account for them.

Influenced by the hope held out in the commencement of Mr. Cohen's paper, that alcohol would afford a means of separating directly the salts from a mineral water, in the state in which they naturally exist in it, I have taken some pains to revise his article experimentally, though I confess I could not discover why alcohol, like other agents, should not exercise some influence in modifying the affinities of the dissolved substances. I however followed his own train of procedure, with the following results:—

Repeating experiment 1st, I dissolved in 600 grains of pure distilled water, six grains of chloride of calcium, and the equivalent proportion of bicarbonate of soda in nearly 700 grains of the same fluid, thus the two solutions each contained $\frac{1}{100}$ of salt.

A. On mingling the two solutions by pouring the former into the latter, a perceptible milkiness was produced, accompanied by some effervescence. This milkiness, which in some cases did not show itself for half a minute, rapidly increased by repose, until after the lapse of about an hour a copious white precipitate covered the bottom of the vessel. The supernatant liquid A gave a precipitate both with carbonate of ammonia and nitrate of silver, showing that it contained undecomposed chloride of calcium.

The precipitate was collected and weighed, it amounted to 2.3 grains whilst the whole quantity present was only 5.5 grains, it was then treated with dilute hydrochloric acid, which occasioned an effervescence and completely dissolved it. Tested by carbonate of ammonia, it proved to have been carbonate of lime.

Here then is a flaw in Mr. Cohen's experiments of some importance, inasmuch as we are led to doubt the assumed stability of chloride of calcium and carbonate of soda, when brought together in solution; it is in truth, a well known fact that these two salts are not compatible, but on the contrary

mutually decomposed each other, and it is more than probable that the lime in the congress water, exists in the state, not of a chloride, as he infers, but in part at least as a carbonate, kept in solution by the excess of free carbonic acid.

It is obvious that the precipitation of carbonate of lime, which at first is very slight, was overlooked by the experimenter, proceeding forthwith to the addition of the alcohol, the consequence of which would be, that not only the undecomposed carbonate of soda would fall down as described, but also by the escape of carbonic acid, the carbonate of lime, which I have proved to be formed, and kept until now in disguise, would likewise precipitate.

B. In experiment 3d, of the paper, thirty proportions of highly rectified alcohol were added to the mingled solutions, and Mr. Cohen mentions that a bulky precipitate fell down without any effervescence, and was found to be pure bicarbonate of soda. In our repetition of this experiment we were of course compelled to filter in order to get rid of the precipitated carbonate of lime, when on adding the proportions of alcohol, we procured not only a precipitate, but likewise a considerable effervescence. Being aware that the addition of concentrated alcohol to water produces the disengagement of bubbles of air, we mixed portions of these fluids in the same proportions for the sake of comparison, but the effervescence was obviously much less. From this effervescence, it is evident that the soda could not have fallen as a bicarbonate, and it is evident to us that the precipitate contains also carbonate of lime, vitiating therefore all the proofs in favour of a quantitative analysis by this method.

C. After this precipitate had entirely fallen down, to prove that the carbonate of lime, before held up by the carbonic acid, had gone down, as just stated with the carbonate of soda, we filtered and tested with a moderately concentrated solution of carbonate of ammonia, whereupon a curious formation of acicular crystals of carbonate of ammonia took place, precipitated from the test, but no trace of lime.

Not satisfied with this, another portion of B was filtered and boiled, but here again there was no trace of any remaining carbonate of lime.

D. In the second stage of the experiment, viz. after the alcohol is added there should remain, if Mr. Cohen is right, only chloride of calcium in solution; with a view to test this, a portion of the alcoholic solution B was carefully filtered, and then evaporated to drive off all the alcohol, when chloride of sodium was procured, as was unequivocally proved by its crystallization and taste.

To conclude then, as we have shown above that we have two carbonates precipitated, where if the analysis was correct there should be but one, so here we have two chlorides in solution when that of lime only ought to occur.

Not having access to specimens of congress water, which we could rely upon as genuine, we have made no analysis of it, nor do we deem it essential to the present description.

The experiments above quoted, we believe, are sufficient to remove all confidence which from its apparent simplicity we might be inclined to place in the use of alcohol as a substitute for heat in this branch of analysis. But even suppose that alcohol could be applied in the first stage as proposed, we do not find from Mr. Cohen's memoir that he has been enabled more than other chemists to dispense with a certain amount of conjecture, as to the manner in which the elements are associated in the water examined.

A hope was held out that the various salts present might be separated directly by alcohol, but we do not discover that his method of distributing the ingredients has been any other than the ordinary inferential reasoning, which shares each acid among all the bases, and *vice versa*, each base among all the acids, a method advocated, as he himself says, by Berzelius and other eminent analysts. How, for example, has the alcohol enabled him to distribute the 18 grains of chlorine (E) in equivalent quantities between the magnesium and calcium, or how enabled him to know that the iodine is in union *only* with the magnesium and not with the calcium and other bases, or that the carbonic acid is held exclusively by the soda. Throughout all the steps but the first, employing the same agents that every chemist employs, there of

course occurred the usual destruction of the natural combinations of the substances in the water, and to restore these to their presumed original state, he has been compelled to resort, as others do—to conjecture.

There are one or two other points about which we are at issue with Mr. Cohen, and with these, and a request that he will excuse our criticism, we shall close our communication. The method of estimating the soda by deflagrating the acetate with nitrate of ammonia, to burn off the acetic acid, is by no means a good one, as a quantity of carbonic acid is inevitably generated. It is moreover out of the question to attempt the estimation of bromine quantitatively when, as in the Saratoga waters, it is associated with chlorine. Nor, as we would beg leave to suggest farther, is the method of detecting bromine by sulphuric acid and gold, employed by Mr. Cohen, of any value in this instance, inasmuch as the same phenomena are exhibited if iodine be present.

As a means of extending a knowledge of the valuable mineral and medicinal waters of our country, we would be glad if any of your readers or correspondents would transmit to us through you, for analysis, specimens of such waters, carefully put up in bottles well sealed, from their respective neighbourhoods.

ART. XLVIII.—*On the Vegetable Tonics of the United States.*

By R. EGLESFELD GRIFFITH, M. D.

No term has a less exact meaning than that of tonic, and the class of remedial agents, so designated, has accordingly been restricted or enlarged to a very great extent, according to the theoretical views entertained by each author that has treated on this subject. Nor has the question, What is the tonic principle in vegetable substances? given rise to less difference of opinion. As this, however, is not the proper place

to enter into an examination of the arguments advanced in support of the respective theories which have been promulgated, we will merely add, that as bitterness is a striking quality of the greatest proportion of those plants which are recognized as vegetable tonics, and has been regarded by some of the most eminent writers on materia medica as their essential attribute, in the ensuing notes, those only of our plants which possess this quality will be touched upon.

The United States abound with vegetable productions having this characteristic, and perhaps no class of our native remedies is in more general use, not only in domestic practice, but also in that of medical men.

The first of the natural orders (following the classification of Lindley,) furnishing plants endowed with marked tonic properties is the *RANUNCULACEÆ*, in which are found:—the *Hydrastis canadensis*, the root of which is extremely bitter, and was a favourite febrifuge remedy among the Indians, and is still much used in infusion, in the western states, as a wash in chronic ophthalmia; it, however, is by no means as powerful as the *Coptis trifolia*, the roots of which are intensely and purely bitter, and are thought by many to be fully equal to quassia. Bigelow states that larger quantities of it are sold in the druggists' shops in Boston than of almost any indigenous production. In this city it is but seldom resorted to, its place being supplied by the Virginia snake root. It has a great advantage of seldom or never producing any disorder of the gastric organs. It owes most of its celebrity, however, to its supposed efficacy in aphthous and other ulcerations of the mouth. To this order also belongs the *Xanthorrhiza apiifolia*, the bark of which, and especially that of the root, is exceedingly bitter. Dr. Woodhouse, who experimented with it, is of opinion that it is preferable to all our native bitters, being closely allied in its medical effects to the colombo; like the *Coptis*, it seldom disagrees with the stomach.

The next order that contains any plants worthy of notice is the *MAGNOLIACEÆ*, all the American species of which are possessed of more or less tonic properties. The various kinds

of *Magnolia* are all furnished with a bitter bark, and might be indiscriminately employed, though there is reason to believe that that of the *M. glauca* is the most powerful, the bark of this species being very extensively used in intermittents with the most unequivocal success; besides its bitter it has an agreeable aromatic taste, though Lindley states that no plant of this order is possessed of aromatic qualities.

Closely allied to the magnolia is the *Liriodendron tulipifera*, the bark of which is very analogous to it in all its sensible properties, except that whilst it is less aromatic and more pungent or warm, it appears to owe its medical powers to a peculiar principle discovered by Professor Emmet, (see Jour. Pharm. vol. iii.) From the experiments of Dr. Young it would appear that besides its tonic powers, that the liriodendron bark is endowed with no inconsiderable antispasmodic powers.

Many of the species of WINTERÆ are aromatic stimulants; the most celebrated of these is the Winter's bark, for which we have an excellent substitute in the *Illicium floridanum*, a native of the more southern parts of the United States. The bark of this plant has a bitter, pungent and spice like taste and smell; sufficient experiments have not, however, been made with it to ascertain its true value.

The *Calycanthus floridus*, belonging to the *Calycanthææ*, judging from its sensible properties, is very analogous to the above, as its bark is aromatic and bitter, but the author of *Med. Flor. U. S.* asserts, we know not on what authority, that it possesses emetic qualities.

We do not meet with a native plant of tonic powers among the succeeding orders until we arrive at the ARISTILOCHIÆ; for although the *Hamamelis Virginiana* is said to be a mild tonic, and enjoys some reputation among empirics in the cure of dysentery, nothing positive is known respecting it. The ARISTILOCHIÆ, however, contain one of the most important of our native tonics, the *Aristolochia serpentaria*, whose remedial qualities are too extensively known to require any exposition of them from us. It may be mentioned, however, that several closely allied species are confounded under the common de-

signation of *serpentaria*; at the same time this is of little consequence, as there does not appear any difference in their remedial powers. In fact the whole genus is remarkably characterized by the conformity of the remedial qualities of the species composing it.

Several of the *ROSACEÆ*, as *Agrimonia*, *Geum*, *Rubus* &c. have also attracted attention as tonics, but as they more properly belong to the class of astringents, possessing little or no bitter principle, and apparently deriving their powers from the presence of tannin, they will not be considered at present.

The *AMYGDALÆ* afford the large genus *PRUNUS*, the bark of all the species of which is more or less tonic and febrifuge; this is particularly the case with the *P. Virginiana*, which is extremely bitter and somewhat aromatic. This is a highly valuable remedy in a variety of diseases. It appears to act in a different manner on the system, than the other vegetable tonics, owing in all probability to the presence of a small portion of hydrocyanic acid. When administered in large doses it is very apt to excite vertigo.

The class of *URTICÆ* presents some striking anomalies among the plants composing it; as to their medicinal qualities, the only one of them which can be considered as a tonic is the well known *Humulus lupulus*, which owes its peculiar action on the system to a resinoid secretion from the strobiles and young leaves, discovered by Dr. Ives, and termed by him *Lupuline*; this substance is intensely bitter, and also is endowed with no inconsiderable narcotic properties.

Almost the whole of the species forming the *SALICINÆ* are medical, their bark usually being astringent, tonic and febrifuge, and has been for a long time used in paroxysmal disorders. Within a short time, however, this group of plants has attracted more attention, from the discovery that they afforded a vegeto-alkaloid analogous to quinine in its curative efforts. The only native species that has been much employed is the *POPULUS tremuloides*, the bark of which has acquired no slight reputation in the cure of intermittent fevers.

With regard to American plants belonging to the *HIPPOCASTANÆ*, little definite is known; as, however, their bark is

very analogous to that of the *Esculus hippocastanum*, so highly praised by numerous writers in the treatment of diseases of an intermittent type, it is most probable that our indigenous species will be found possessed of similar good properties.

The class *POLYGALEÆ* is characterized by the bitterness of its species, and in the *KRAMERIA* possesses one of the most powerful vegetable astringents with which we are acquainted. The only native species, however, which has attracted notice for its tonic properties, is the *Polygala rubella*, this is exceedingly bitter, and Bigelow in speaking of it states that he has been assured by those practitioners who have used it, that its infusion in small doses proved eminently useful. It in fact appears to be closely allied in medical effects to the *P. amara*, and *P. vulgaris*, of Europe.

The next class that requires notice is the *ILICINEÆ*. The *Ilex aquifolium* of Europe, with which our *I. opaca* is closely allied, if not identical, has lately attracted considerable attention from the febrifuge powers of its leaves, which have been extensively experimented on by Dr. Rousseau, in France, with the most unequivocal success. No trials have been made with those of the *I. opaca*, but it is highly probable that they would be found equally efficacious. Another plant of this order, the *PRINOS verticillatus*, has attained much celebrity as a tonic, but does not appear to deserve the eulogies it has received. Dr. Bigelow is of opinion that it is far inferior to a number of our other native remedies, and Dr. Darlington seems to think that it is entitled to but little confidence.

The great order of *COMPOSITÆ* furnishes numbers of plants highly celebrated for their tonic powers; it would lead us beyond all due limits to attempt even an enumeration of the species which have at different times been employed in medicine; we shall therefore confine ourselves to a notice of the most important of them, at the head of which stands the *Eupatorium perfoliatum*, every part of which is very bitter, and is used to fulfil many indications, as it may be so administered as to act as a tonic, a diaphoretic, or even as an emetic; when used for the first purpose, it is to be given either in powder or in cold decoction or infusion. The great ob-

jection to its employment is the disagreeable taste of all its preparations. Many other species of this genus are possessed of analogous properties, though none have come into such general use. The *Anthemis cotula* forms a substitute for the officinal chamomile, but its taste is much more nauseous, and requires to be given in small doses, as it is very apt to produce emesis. It is probable that many species of *Solidago* deserve attention as aromatic tonics, but the only one which has come into use is the *S. odora*; this although not properly a tonic, is entitled to notice, from the essential oil obtained from it, which although in common use in domestic practice in many parts of the United States, is seldom or never employed by physicians, though it is fully equal to most articles of its class imported from abroad.

As might be anticipated the order CINCHONACEÆ contains some indigenous species, having active tonic properties. Thus the bark of *Cephalanthus occidentalis*, has a highly aromatic bitter taste, not unlike cascarilla; that of the root is the most powerful. The article, however, which most closely resembles cinchona in all respects, is the bark of the *Pinckneya pubens*. This has long been used in the southern states, where it is indigenous, as a substitute for the Peruvian bark, with the most unequivocal success. From an imperfect analysis of it by Mr. Farr, it appears that it contains a large quantity of cinchonine. As in all probability it would form the best succedaneum for the foreign bark, it should be thoroughly experimented on, and we would draw the attention of our southern readers to this subject.

The CAPRIFOLIACEÆ partake in a great measure of the properties of the last order, the bark of most of the species being astringent or bitter; this is most remarkable in the genus *Cornus*, which affords a good substitute for cinchona, though it differs from it in some respects in its action on the system, as it often affects the bowels, more especially if administered in a recent state. All the species may be used, but the *C. florida* has been found to be the most powerful. It contains a vegeto-alkaloid, termed cornine, which, however, is in too small a proportion to be the only medicinal principle. From

experience it has been found that the bark is best given in combination with some other article, as the serpentaria or quassia.

The bitter order of the GENTIANEÆ is fully represented in the United States. Thus the root of the *Gentiana catesbæi* is very little inferior to the gentian of the shops, either in strength or efficacy, and it is probable that on trial many of our other species will be found equally medicinal. The root of the *Frasera Walteri* has received the name of American Columbo, and forms a good substitute for it, though Dr. Ives contends it is inferior to many others of our native tonics. It should be given in a perfectly dry state, as when recent it is very apt to prove emetic and cathartic. The *Sabbatia angularis* is well known throughout the United States, for its active tonic virtues, and deservedly holds a high rank as a febrifuge in intermittent diseases. Like the gentian it is a pure bitter, with no aroma or astringency, which is also the case with the *Menyanthes trifoliata*, the most of which in the opinion of Dr. Bigelow is fully equal in strength to imported articles of the tonic class, and may hereafter lessen our dependence on foreign drugs.

Among the SCROPHULARINEÆ it would scarcely have been expected that a tonic bitter should be found, and yet there is no one of our native plants which possesses the bitter principle more in abundance than the *Chelone glabra*. Rafinesque is the first author who has spoken of this plant, on the authority of the Shakers of New Lebanon. He states, and from trials made with it there is no doubt of the fact, that it is more intensely bitter, without aroma or astringency, than any of the articles heretofore mentioned. It, however requires a full investigation as to its real powers, as from the order to which it belongs it is likely that this bitter principle is joined, as in aloes, to some other of equal power.

Among the MONOCOTYLEDONOUS plants, there are few endowed with tonic properties; the *Melanthaceæ* affords the *Helonias dioica*, the root of which is of a nauseous bitter taste, and has been employed as a tonic in many parts of the United States; it is emetic in large doses, and is at best an unsafe

article. In the ASPHODELEÆ, however, is the *Aletris farinosa*, whose root is intensely bitter, affording a resin which resembles quassia in taste. It is mingled with some other principle which prevents it from being administered except in very small doses, an over quantity producing nausea and narcotic symptoms. The best mode of giving it is in infusion.

It will be perceived from the above list that nature has most amply furnished the United States with plants possessed of tonic properties, and although none of them are perhaps equal to the Peruvian bark, there are many that may be used as substitutes for this article, and still more that form admirable adjuvants to it.

ART. XLIX.—*Pharmaceutical Notices*.—No. 9.

THE beneficial effects which have followed the former publication of these notices, have induced us to record such occurrences as appeared worthy of notice, as they transpired in the regular routine of business. We now hand you a few in the hope of arousing an interest among the members of the profession for such details, from a firm belief that much valuable information may be derived from a source hitherto too much neglected.

T. & F.

Iodine Liniment.—A phial of iodine liniment, prepared by adding one ounce of tinct. of iodine to eight ounces soap liniment, of a rich deep brown colour when made, became, after standing twenty-four hours, completely changed in its hue to the colour of soap liniment. The change is attributed to the reaction of the iodine upon the soda of the soap, by which it is converted into hydriodate of soda. This fact, if iodine be more useful than its salts, when externally applied should induce us to prepare the liniment in small quantities only, and immediately previous to its application.

F.

Citrate of Potassa.—The use of this salt as a substitute for the unpharmaceutic preparation by lemon juice and carbonate of potassa in neutral mixtures, induced us to prepare con-

siderable quantities of it. The following is a ready mode, and we believe has never before been recommended in print:—

Take of crystals of citric acid, powd. parts 9.50

“ “ salt of tartar (carb. potassæ) 11.

Combined and dried, at 212° they produce citrate of potassa, 16.62 parts.

The carbonate of potassa should be dried at a temperature of 212° , and the citric acid at a rather less heat. They must then be well rubbed together in a mortar. A few drops of ol. lemon, added, render the mixture very pleasant. T.

Chameleon Mineral.—We have in vain essayed to prepare this article agreeably to the directions of Henry and Webster's Chemistry, by the infusion of *nitrate* of potassa with black oxide of manganese, and mention the fact that others may not waste their materials and labour on this process.

Pure caustic potassa, fused with the oxide may be confidently relied on to produce the salt. F.

Sulphur Precipitatum.—The results of several analyses satisfy us that an *economical* practice is adopted by many manufacturers of this preparation of separating the lime of the sulphuret, by means of sulphuric instead of muriatic acid, and that consequently the pharmacist who does not prepare his milk of sulphur is administering from thirty to fifty per cent. of sulphate of lime in the place of that quantity of pure sulphur. F.

Extra Soda Water.—Five grains of bicarbonate of soda in a bottle of soda water with pine apple syrup, were found, during the last summer, to have changed the syrup into mucilage, in the course of twenty-four hours. The appearance of the contents of the bottle very much resembled cold flax-seed tea. The bottle was returned by the patient, who thought something had improperly been mixed with it. Two or three experiments with bottles similarly prepared, however, confirmed us in the opinion expressed at the commencement of this paragraph, that the change was owing to the action of the alkali on the sugar of the syrup. F.

Analysis of Coal.—Nitrate of ammonia is found to answer the best purpose in effecting the abstraction of the carbon,

for estimating the quantity of earthy matter. In the analysis of a bituminous coal, the gases having been previously removed by distillation, and the loss of weight ascertained, the coke is then mixed with dried nitrate of ammonia, exposed to a red heat in a crucible, and the carbon completely consumed. The loss of weight again ascertained gives the quantity of combustible matter, and the remainder in the crucible is the weight of earthy matter. This may appear a trifling detail to the practised chemist, but to a beginner we are convinced such a recital of details is of invaluable service. It is a kind of information in which the experience of every one has taught him, that the books are too deficient. T.

Crystals in Ext. Hyos. Nig.—It is well known that many of the extracts, particularly those which contain chlorophylline, gradually become hard, and present in their interior and more especially on their exterior surface, small, though well defined crystals. This is frequently the case with the ext. hyos. nig., and according to Recluz, these are of two kinds; nitrate of potassa, and chloride of sodium. Having occasion lately to examine a specimen of this extract, I discovered in it, beautiful white transparent crystals, which on analysis proved to be nitrate of soda. The spontaneous formation of these crystals in the different extracts, is deserving of attention; for we often, as in the case just cited, find them composed of bodies which we are unable to detect in the plant from which these extracts have been made.

Adulteration of Sulphate of Quinine.—Among the numerous adulterations to which the imported sulphate of quinine is liable, is that by salicine, which is now manufactured on a large and at a cheap rate in Europe. This adulteration may be detected by means of concentrated sulphuric acid, which decomposes the salicine, forming a purple coloured fluid. The acid should be concentrated, as the diluted acid of the U. S. Pharmacopœia has no effect.

Extracts Belladonnæ and Hyoscyami.—Geiger and Hesper have found that the best method of preparing these extracts

of a uniform strength, is to exhaust all the virtues of the fresh or dry plant with cold water; to separate the clear fluid, reduce this to the consistence of a syrup, treat this with alcohol, which is afterwards to be distilled off in a water bath. From experiments, it is proved that the extract made from the dry plant is fully as powerful as that from the fresh.

L. F.

Extractum Humuli.—The American Dispensatory justly observes, that since the discovery of lupuline, this extract has not been deemed an eligible preparation. Was it ever an eligible preparation? Does not the heat required to evaporate the decoction deprive it of most of its active principles? That it contains a vast proportion of inert matter may be judged from the fact mentioned by Brande, that one cwt. of hops will afford forty of extract.

Oleum Tiglii.—One of the neatest modes of administering this energetic purgative, is the form of an alcoholic solution, in the proportion of eight drops of the oil to an ounce of alcohol. Dr. Nimmo gives the following formula for a mixture which he has found very efficacious:—

R. Solut. alcohol ol. tiglii	3ss.
Syr. simp.	
Mucil. acaciæ	a a 3ii.
Aquæ distill.	3ss.

A little milk to be taken before and after swallowing it.

Oleum Valerianæ.—As the virtues of valerian appear to depend on its essential oil, which is of a greenish white colour, and volatile, ought not this preparation to be recognized in our pharmacopœias and dispensaries. It is so in those of the continent of Europe, and in Germany is preferred to almost every other preparation of valerian. It is prepared in the usual manner by distilling the root with water. There is, however, much diversity of opinion as to the proper proportions of these. Thus the Belgic and Russian pharmacopœias order merely *q. s.* of water; the Hanoverian, Polish, Prussian and Saxon, four parts of water to one of the root; the

Bavarian nine of water to one of root, and the Austrian twelve of water to one of root.

Lupuline.—Mr. Raspail states that it is an erroneous idea to suppose that the bitter principle of the hop resides in the pollenic glands alone. All the leaves and even the stems afford it; in fact, the young leaves will furnish almost as much as the strobiles. G.

Tartar Emetic Plasters.—So far as I am aware, the attention of our apothecaries has never been drawn to the question of the best mode of making the above plaster. A very common practice is to sprinkle the tartar emetic on a Burgundy pitch plaster; but in this case the quantity of the tartar emetic is too small to have a complete effect, although sufficient to destroy the adhesive property of the pitch; and at best the latter is by its harshness excessively painful to the skin. Another way in which it is sometimes prepared, is by sprinkling the powder on a plaster of *emplastrum resinæ*; to which the first and second objections mentioned above equally apply. I believe the best method of preparing this very useful application, is to mix the tartar emetic with adhesive plaster, in the proportion of about three drachms to one ounce, and with this mixture to spread the plaster of the desired form and size. It is perfectly adhesive, without harshness, and very effective.

Unguentum Tartari Emetici.—The only formula for this preparation, to be found in the Dispensatory of the United States, is from the Dublin Pharmacopœia, which directs one drachm to one ounce of lard. This proportion appears to me too small, and is often indeed found to be long in producing the effect intended. I should propose two drachms to one ounce, and the tartar emetic to be previously reduced to an impalpable state by precipitating it from the saturated aqueous solution by alcohol.

Moxa.—On page 206, (et seq.) vol. ii. of this Journal, are some interesting and valuable observations by our corresponding secretary on various expedients for preparing moxas, none

of which appear to have been entirely satisfactory in practice. Perhaps the best there mentioned are the French moxas prepared by impregnating cotton with nitre; but these are subject to some inconveniences. I have lately prepared a moxa with a solution of bichromate of potassa, which appears to answer very well. It may be made in the following manner:—Macerate strips of coarse cotton or muslin in a saturated solution of the above salt; and when nearly dry roll them tightly on a piece of wire of the twentieth of an inch in thickness, until the cylinder shall be about three-fourths of an inch in diameter, or as thick as may be thought desirable. The roll must then be wrapped round very tightly with strong thread, and covered with a piece of fine muslin, stitched over it. The wire may then be withdrawn, and the cylinder completely dried. When wanted for use, a small piece of the requisite length may be cut off by a sharp knife, and fixed on the part by a piece of adhesive plaster, having a cross cut in the centre. This moxa burns with a more uniform and steady ignition than those prepared with nitre. W. H. jr.

ART. L.—*Note on Egyptian Opium.* By J. SCATTERGOOD.

A FEW months since, a large importer of drugs &c. in this city, received via Leghorn, a case of opium, which was invoiced and sold to many of our druggists as Egyptian. Its attractive appearance, being in small, flattened pieces, very dry, and free from the impurities with which good opium is very often contaminated, combined with its taste and strong narcotic odour, procured for it a very ready sale.

In operating upon a pound of it, with a view to obtain its morphia, I was struck with the very small product, and led at first from this circumstance and some peculiarities observed in its solution in water, to suspect that it might be a factitious production from some of the laboratories of Marseilles, where Guibourt says they make the opium over again. Upon referring, however, to his description of the Egyptian va-

riety, I find it corresponds with it, except in its odour, which is quite as strong as the Smyrna, whereas that of Guibourt was weaker.

A pound troy yielded by the Pharmacopœia process but $6\frac{1}{2}$ drs. of impure crystals which were more largely contaminated with narcotine than the similar product of good Smyrna opium. Guibourt in ascertaining the product of the three kinds which he experimented upon, obtained from 4 oz. of each, (that is, Smyrna, Egyptian and Constantinople,) 2 oz. and 3 drs. of friable, watery extract, indicating a loss by the treatment of 59 per cent., whereas water took up of the pound I operated upon all but $3\frac{1}{2}$ oz. which showed a loss of upwards of 75 per cent. He obtained of impure morphine from 4 oz. of the Egyptian variety 4 drs. 40 grs., very nearly three times the quantity I obtained; which is a very decided evidence of there being a very material difference in the two articles notwithstanding their similarity in other respects.

ART. LI.—*Medico-Botanical Notices.* No. 1.

[UNDER this title it is intended to give short notices of the botanical characters and pharmaceutical uses of such plants employed in medicine as are least known, or on which any thing new can be offered; they will not be confined to original notes alone, but advantage will be taken of all the information to be gleaned from foreign publications, though a preference will always be given to such communications as tend to elucidate our native remedies; and we earnestly solicit our subscribers to aid us in this undertaking, for however trivial the knowledge they possess of the history or qualities of any remedial agent may appear to them, the communication of this knowledge to others may prove of eminent importance, by supplying materials for a perfect account of our materia medica.—*Editor.*]

ANTHEMIS cotula.—Having witnessed the prompt and decided efficacy of this plant as a vesicatory, and believing
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that some good vegetable epispastic was a desideratum, my attention was early directed to it, as an article well calculated to supply the deficiency. It has received a variety of names in different sections of the United States, as wild chamomile, may-weed, stinking chamomile, and dog fennel. It is an annual, and abundant in most uncultivated fields, road sides &c. flowering from midsummer till late in the autumn.

Although the *A. cotula* has been extensively used in domestic practice, and even has enjoyed considerable reputation with some physicians as an internal remedy in various diseases, it has never been used as a vesicatory in this country; on the contrary some of our most eminent botanists have asserted that the greatest difference existing between the European and American plants was in the latter not possessing this power; and Dr. W. P. C. Barton states that it is likely that they are not identical, grounding this opinion on the greater activity of the foreign variety.

From my experience with it, however, and from the information I have received from several eminent practitioners, I consider the following conclusions fully established:—

1. That an application of this plant in a bruised state to the skin, will produce vesication, with as little irritation and as speedily as cantharides.

2. That it is more permanent in its effects.

3. That it may be employed in cases where cantharides would be injurious.

The vesication induced by the application of the *A. cotula* is readily healed, thus differing from those caused by most of the other vegetable epispastics, as the *Ranunculus*, *Daphne* &c.

The usual method of employing this plant when used as a vesicatory, is to collect the flowers and green branches, which are to be bruised or cut very fine, and applied in the form of a poultice. I am fully persuaded that an extract sufficiently active to induce vesication could be obtained, but have hitherto been unsuccessful in my experiments for this purpose. In a letter lately received from a distinguished physician, he states that he has employed the *Anthemis* for a

long time, and in a variety of cases, both in military and private practice, and that he has found it to vesicate in less time than cantharides, whilst the counter irritation thus produced was of a more permanent character.

Wm. Ashley, M. D. of Va.

LAURUS cassia and cinnamomum.—Notwithstanding the length of time cinnamon and cassia have been known, and their great importance in a commercial point of view, the utmost uncertainty still exists whether these barks are the product of distinct species of plants, or owe their differential characters to culture, time of gathering, or to the part of the tree from whence they are derived. Garcias, who wrote in the sixteenth century, and from his situation of physician to the Viceroy of Portugal, had ample opportunities of becoming acquainted with the productions of India, declares that all the varieties of cinnamon are furnished by the same tree, and the same opinion was held by Monardes. Notwithstanding their positive declarations, the idea gradually gained ground that these barks were furnished by different species, and both Linnæus and Lamarck admitted the *L. cassia* and *L. cinnamomum* as well founded. Their authority for a long time was undisputed, although Thunberg who resided for a considerable time in the East, looked upon the distinction as unfounded. Of late years, however, botanists are inclined to admit that Garcias was correct in insisting on the identity of origin of these barks. In a letter from J. B. Batta, of Prague, to Mr. R. Brown, published in the last volume of the Transactions of the Linnæan Society of London, he expresses the difficulty he has experienced in tracing the synonyma of *L. cinnamomum* and *L. cassia*, and after a careful examination, is inclined to consider them the same; he also states that the plant usually found in collections under the name of *L. cassia*, is in fact the *L. malabathrum*, distinguished by its large, glossy, coriaceous leaves, divided calyx, and smaller fruit. The *L. javanensis* which yields the bark brought from Java, under the name of *Cassia lignea vera*, he also regards as a variety of the *L. cinnamomum*. The Chinese cassia lignea

bark, and the cassia buds of commerce, he thinks are the produce of an unknown species, distinct from *L. dulcis*, Roxburgh, and perhaps identical with a species in Mr. Lambert's herbarium marked *L. manillensis*.

Bergius long since asserted that the leaves known under the name of *malabathrum* were the produce of the *L. cassia*, whilst Paulet states they are derived from the *L. cinnamomum*. As to the Linnæan *L. cassia*, it is difficult to fix it with any certainty since he refers to two different plants figured in the *Hortus Malabaricus*, and in *Burm. Zeylan*, both of which have very acute leaves.

In fact from all that can be gathered on this intricate subject it appears evident that the *L. cassia* must be considered as a fictitious species, being merely a variety of the *L. cinnamomum*, or as supposed by Bergius and Batka the *L. malabathrum*. As respects the Chinese cassia, it may or may not be the product of an unknown species, but our present information on the subject does not warrant us in considering it as any thing more than a mere variety. It should be noticed that Blume has erected these plants into a separate genus, in which he is followed by Brown and Hooker. G.

ART. LII.—*On the active principle of Lobelia inflata.* By S. COLHOUN, Professor of Materia Medica in Jefferson Medical College, Philadelphia.

THE active principle of this plant is a brown, molasses like fluid, resembling in its physical qualities nicotine as prepared by Berzelius, tasting strongly of the lobelia, exciting the same peculiar pungency in the throat, which remains for some time, and requires repeated ablution to remove it. It is slightly deliquescent, becoming moist in damp states of the atmosphere; it is very indestructible by the common changes and temperature of the air, retaining the characteristics of the plant after remaining for three months in an open cup, exposed in a damp place to the heat of summer. It is very

soluble in alcohol ; scarcely, if at all, in ether : in this respect it differs from nicotine : the active principle of the *Lobelia inflata* does not even colour ether to which it has been added.

Its natural colour is a deep brown, which is lightened by being treated with charcoal ; it then becomes of a yellowish brown.

Lobelia forms salts with the acids ; the tartrate of this principle is a deliquescent salt ; saccharine in the appearance of its crystals, though not entirely distinct ; they are brought to this state only by exposing them to the moderate temperature, at which water evaporates.

The sulphate exhibits much the same appearances, as also does the muriate ; these salts are all deliquescent, retaining strongly the taste of the *lobelia*.

The process by which this active principle was obtained, was first by dissolving it in acidulated water, muriatic acid being used for this purpose ; the menstruum continued to act upon the leaves for seven hours ; it was then evaporated, the heat separating the superfluous acid.

Crystals, on the fluid being sufficiently reduced, were discovered on the bottom of the vessel ; they were mixed with some foreign earthy salt, the existence of which was proved by burning the substance remaining after the evaporation in a small bottle kept for some hours in a red heat.

To avoid the salts thus formed with the acid, alcohol was used as the solvent ; the extract remaining after its evaporation was beautifully transparent, and had the other properties above described. It was this extract that was principally used to form salts with the acids.

From a number of experiments made with the infusion, it is evident that there exists some superabundance of acid, which is probably the acetic.

ART. LIII.—*Some remarks on the Pottery used by the Aborigines of North America.* By JACOB GREEN, M. D., *Professor of Chemistry in Jefferson Medical College*

IN a communication respecting some of the arts known and practiced by our aboriginal tribes of Indians, published in the second number of the present volume, I merely hinted at their wonderful skill in manufacturing earthen ware; my present object is to state some further particulars connected with this interesting subject.

When on a late visit to Wheeling in Virginia, I examined a number of specimens of earthen ware found in that neighbourhood; there appears to have been no ancient fort, camp, or military work in the immediate vicinity, but on the western bank of the Ohio river, on the very site of this flourishing town, there was once a village, a place of public worship, or perhaps merely the habitation of some distinguished chieftain. In proof of this, a few years since, a little to the north of the town, a *hearth* or fire place was discovered, not many yards from the bank of the river, and about four feet below the surface of the ground. The floor of the hearth was composed of large flat stones, and was strewn with pieces of charred wood and with ashes. There were no bricks,* or any earthen ware found near the place. This spot, I concluded, must either have been an *altar*, where religious rites were performed, or a *hearth* for the ordinary culinary operations of a family.

Some distance to the south of this altar or hearth, was the place of burial or *cemetery*. This was first noticed some years ago, by my friend, Dr. J. W. Clemens, an intelligent physician and a zealous antiquary, now residing in Wheeling. He informed me, that some workmen, while digging a cellar for him, in one of the principal streets of the town, observed a number of human bones, and some fragments of earthen ware. On offering them a small premium, they succeeded in getting out of the *tumulus*, three or four small earthen ves-

* I saw part of a brick found some miles farther down the river. Its surface was fluted, some mould being impressed upon the clay before it was burnt.

sels, and a number of arrow heads, stone axes, and rude ornaments of clay; enough of the skeleton was also ascertained to convince Dr. Clemens that it was buried in a sitting attitude. Two of the earthen vases, or urns, I had the pleasure of examining. One of them is in the possession of a gentleman in Wheeling, and the other is now deposited in the Lambdin Museum, at Louisville, Ky. They were all nearly of the same figure and capacity, and would contain about one quart.

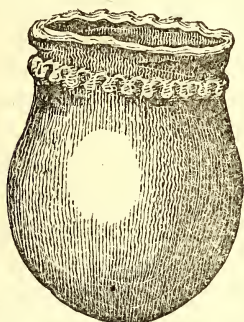


Fig. 1.

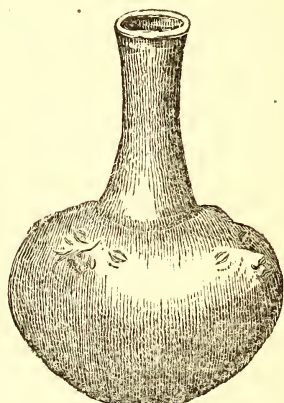


Fig. 2.

Figure 1, of the accompanying sketch, is an accurate drawing of the vase in the Museum. It differs from the others, in being ornamented on the outside near the brim, by a line of bead-like protuberances; the others were entirely plain. The symmetrical proportions of these vessels, and the smooth surface they present, render it highly probable that they were formed in a lathe, in the same manner as potters ware is now modelled. The inside of the urns appears to have been blackened either by smoke or the articles which they contained. The composition of which these vessels are made, is a mixture of talcose earth, clay, and pounded muscle shells, the unios of the Ohio river. They are without glazing, and have not been burned in a kiln, as our common earthen ware, but merely hardened by exposure to the sun and air, for by minutely examining the shells mixed with the clay, they were not in the smallest degree calcined; in most cases

the *nacre* of the shell is quite pearly and glittering. The vessels are capable of supporting, however, a high temperature, for Dr. Clemens boiled water in one of them.

There is a delicacy, perfection, and symmetry in most of the earthen vessels, found in the ancient tumuli of the west, which cannot be observed in any of the other articles which are usually disinterred with them. The stone axes, arrow heads, and other implements are often of the rudest construction. From this circumstance I think it probable, that the females, or the priests, or those whose ordinary occupations confined them at home, were the ancient American potters, and that the other articles were fabricated by men engaged in the bustle and business of war, or in the pursuits of the chase. In the Philadelphia Museum, however, there are some very curiously wrought instruments of stone, and among the rest a kind of tomahawk, made from a beautiful mass of translucent quartz. Perhaps this instrument was made and used by the priests, to immolate their victims.*

Dr. Clemens informed me, that two of the above vases, when first discovered, were filled with the bones of some small quadruped, and as far as he could identify the crumbling fragments, they were those of the *rabbit* or *squirrel*. They were deposited by the side of the deceased, that he might have, according to a traditionary superstitious notion, something to eat at the resurrection or reanimation of his body. This story, I have no doubt, is the invention of the present race of Indians, who now inhabit our western wilds. It has been the usage of many ancient nations, a usage which is, even now, scarcely obsolete, to bury in the same grave some symbol of the favourite amusement or occupation of the deceased. Thus, with the bones of the warrior, a battle axe will often be found, or perhaps his arrows and bow. Mr. Atwater, the indefatigable antiquary of Ohio, remarks, "that with the hunter is often interred, that kind of wild game of which he had been the fondest, or the most

* Many persons have supposed this tomahawk to be glass, but as I could not fuse a small fragment with the blowpipe without the addition of a *flux*, it is no doubt quartz.

successful in taking. Hence, the teeth of the otter are found in the grave of one, and those of the beaver in that of another." One who had been successful in fishing, is distinguished by a number of fish bones and muscle shells. If these opinions be correct, the ancient American, whose skeleton was found at Wheeling, must have been a famous hunter of the squirrel, or the rabbit.

In the Transactions of the American Antiquarian Society, vol. i. page 227, there is the sketch of a vase very much resembling the one we have given at figure 1, but it is more globose, better proportioned, and more highly finished; it was obtained in a mound, a few miles from Chilicothe. Dr. Hildreth, of Marietta, has also described a vessel, "nearly in the form of a cocoa nut shell," with four neat handles near the brim, opposite to each other; it was found in the bank of an island, not far from Belpre. These vessels seemed to have contained calcined human bones, and from their dark appearance, oil seems to have been poured into them along with the bones. In Pennant's Tour in Scotland, vol. i. plate 21, there is the representation of a fine urn, discovered in a cairn or mound, near the town of Banff. This vase is thought by Mr. Atwater, to resemble the one found near Chilicothe, and which is so much like our figure 1; but the likeness, in my estimation, is exceedingly remote. Yet though there is little similarity in the shape of these vessels, a variety of circumstances connected with them, intimate a great resemblance between the manners and customs of the people by whom they were manufactured and used. That the sepulchral rites of the early inhabitants of Scotland, were very analogous to those of the ancient tribes of Americans, who lived near Wheeling, must strike every one who reads Pennant's account of the urn of Banff. "It was discovered in a cairn or tumulus, in a coffin of flat stones; it was ornamented, but round it were placed three others, smaller and quite plain; the contents of each were the same, ashes, burnt bones, and flint arrow heads. There was also in the larger urn and one of the lesser, a small slender bone, four inches long, apparently not human, but the animal to which it belonged, and

the uses were unknown. The materials of the urn, consist of a coarse clay, mixed with small stones and sand, which have evidently been only dried and not burnt; the inside of the larger urn was blackened, probably with the oil from the bones." This is the substance of Pennant's account. It will be recollected that in the cairn at Wheeling, *one* ornamented urn and several plain ones were found, and that in several other particulars, that burial place resembles the one above described.

In the Philadelphia Museum, which is exceedingly rich in American antiquities, there are three very fine vases, composed of similar materials as those in the one above described. One of the vessels is from a mound in the state of Tennessee. It is in a globular form, with a short, thick neck, ornamented on the top with a good figure of an Indian's head. The orifice of the vessel is at the back of the head. It measures about twelve inches in height and about nine inches in diameter. The clay of which it is composed is of a light ash colour. The second vase is nearly spherical, and is in a high state of preservation; some large pieces of shell imbedded in the clay, preserve the pearly lustre of the nacre, so perfectly, as to settle the fact that it could not have been baked in the fire of a kiln. This was found at St. Genevieve, on the Mississippi. The third vase is an open pot, rudely ornamented on the exterior surface near the brim. Its locality is unknown. It is exceedingly desirable that accurate figures of these vessels should be engraved.

Figure 2 of our drawing, represents an earthen ware bottle found in Scott county, state of Mississippi, twenty feet below the surface. The clay is much purer, and the workmanship far superior to the Wheeling urns. It is of a dark umber colour, and was brought from the tumulus by my friend, Mr. S. of Pittsburg. In examining the smooth and polished surface of this beautiful vessel, it is scarcely possible to resist the inference that it was modelled in a potter's lathe. The drawing made of it, by the kindness of Mr. Lambdin, a promising artist and the liberal proprietor of the Museum at Louisville, will give a correct idea of its general appearance. It will

contain about a quart. The clay and the shells of which it is composed, must have been thoroughly beaten and worked together before it was moulded.

It is difficult to conjecture to what use this antique bottle was applied. It was most probably used in burial ceremonies, or was in some way connected with superstitious rites. I have seen some ancient Grecian lachrymatories, not very unlike it in figure; and perhaps the aborigines of the west, employed this vessel to gather the tears in honour of the dead. On the upper part of the body of the vessel, there are four representations of the head of some quadruped. When I first examined these rude specimens of sculpture, I supposed that the head of the animal intended by the artist, was that of the hog. The head of the *Sus tajassu*, or Mexican hog, cut off square, was found a few years ago, in a good state of preservation, in one of the saltpetre caves of Kentucky. Dr. Drake's notice of this curious circumstance, which I have just read, confirms this opinion; though an ingenious friend has supposed, that the head carved on the vase was that of the bear. The head mentioned by Dr. Drake, seems to have been preserved with superstitious care, with the same intent, probably, that the ibis and the beetle were embalmed by the Egyptians.

That bottles ornamented with various devices, were sometimes used by our aborigines, for idolatrous purposes, is quite certain, from the one found at Natchez, and now in the cabinet of the American Antiquarian Society, and also from the three headed bottle, discovered in a mound, on the Cumberland river. These heads are supposed by Mr. Atwater, to represent the three principal idols of India, Brahma, Vishnoo, and Siva. He, therefore, is of opinion, that the authors of our ancient works in the west, originated in Hindostan. These works, we know, are located near our principal rivers. "To the consecrated streams of Hindostan, devotees assembled from all parts of the empire, to worship their gods, and to purify themselves by bathing in their sacred waters. In this country, the sacred places of the aborigines were uni-

formly on the bank of some river, and who knows, but that the Muskingum, the Sciota, the Miama, the Ohio, the Cumberland, and the Mississippi, were once deemed as sacred, and their banks as thickly settled and as well cultivated, as are now the Indus, the Ganges, and the Burrampooter."

REVIEWS.

ART. LIV.—*The Dispensatory of the United States of America.*
By GEORGE B. WOOD, M. D., *Professor of Materia Medica
and Pharmacy in the Philadelphia College of Pharmacy
&c. &c.*; and FRANKLIN BACHE, M. D., *Professor of Che-
mistry in the Philadelphia College of Pharmacy &c. &c.*
2d. ed. *Enlarged and carefully revised.* Philadelphia.
1834. pp. 1162. 8vo.

WHEN in the concluding number of our last volume we gave a review of the United States Dispensary, we little expected, highly as we appreciated its merits, that we should be called on to notice a second edition of it within the year. There can be no better proof of the estimation in which a literary work is held by the public, than its rapidly passing through successive editions, and we trust that the learned authors of the United States, may every year be thus called upon for a renewal of their labours.

In the few remarks we have to make at the present time, we cannot do better than to transcribe their own observations in the preface, premising at the same time, judging from our necessarily hasty comparison of this edition with the last, that they have scarcely done themselves justice. “They have subjected the whole work to revision, correcting errors which occurred to their own notice, or were kindly pointed out by their friends, supplying omissions wherever observed, curtail- ing superfluities both of matter and expression, and occupy- ing the space thus gained, by such additional facts and com- ments as appeared to them most likely to be useful.” “The authors have had recourse, with advantage, to the recent vo- lumes of Berzelius’ great work on chemistry, and to several German treatises of high authority on botany, materia medica and pharmacy.” Several new articles, as those on coffee,

tea and tannin, have been added to the division of *materia medica*, and in the appendix has been given a list of numerous drugs and medicines not included in the officinal catalogues, with brief descriptions, proportioned to their former or present importance, or to the degree in which they are related to medicine and pharmacy."

It would lead us beyond all due limits to attempt to point out and comment on the various alterations and additions that have been made to the work in this edition; it will be sufficient for any one to compare the first articles in each, (on gum arabic,) to be convinced that the authors have sedulously sought out and made efficient use of every thing of importance that has appeared since the date of their first publication. There is also another advantage this edition possesses, that of not being as unwieldy as its predecessor, for although containing many additional pages, from being printed on thinner paper it is of a much more manageable size. The only objection we have to make is to the appendix; most if not all of the information contained in it might have been incorporated in the body of the work, or if not considered of sufficient value to be thus disposed of, had better have been omitted.

ART. LV.—*Manual of Practical Toxicology: condensed from Dr. Christison's Treatise on Poisons; with Notes and Additions.* By J. T. DUCATEL, M. D., *Professor of Chemistry and Pharmacy in the University of Maryland &c. &c. Baltimore.* 1833. pp. 341. 12mo.

WE have been much pleased with this little work, which although it purports to be merely a condensation of Dr. Christison's admirable treatise on poisons, is entitled to take a higher rank than as a mere abstract. The matter is presented in so different a form as to present as much claim to originality as nine-tenths of the works of the present day.

Although it is chiefly designed for the use of medical men, we cannot too strenuously recommend it to the perusal of the

apothecary, who from his supposed practical acquaintance with most of the articles which are included in the long catalogue of the poisons, is liable to be called upon as a witness in cases of suspected poisoning; it therefore behoves him to be prepared to subserve the ends of justice and the interests of the community by a proper acquaintance with the facts contained in this work.

The arrangement of the subject matter is good; the classification is virtually that of Dr. Christison, but is an improvement on his, from the manner in which the subdivisions are constituted, which with the plan of numbering the paragraphs greatly facilitates a reference to any particular fact; and we may add, that there is that *sine qua non* of a good book, a copious and carefully prepared index.

“The notes and additions consist chiefly of explanatory observations on the text, which is to be understood as exclusively compiled from Dr. Christison’s treatise; a tabular view of the class of irritant poisons, references to the chief pharmaceutical and artificial preparations, containing ingredients ranked among the poisons; fuller accounts of the mode of treatment for several poisons, principally as regards the chemical treatment by antidotes; descriptions of the botanical characters of the poisonous families of plants, of which the most common genera and species are mentioned, and those indigenous to America inserted, and their properties specified; and some additional facts concerning the singularly corrosive effects of chromic acid, and the poisonous properties of its salts.”

To enable our readers to judge of the manner in which Dr. Ducatel has executed his task, we subjoin a specimen:—

SECT. III.—OF POISONING WITH COPPER.

1. *Of the Action of Copper, and the Pathological Symptoms it excites in Man.*

The salts of copper act in whatsoever way they are introduced into the system, and the more energetically, the more directly they enter the blood.

The symptoms caused by copper have at least two varie-

ties in their character. One class arises from its local action on the alimentary canal; the other from its operation on distant organs.

The symptoms caused by the soluble salts* of copper in man, are, in a general point of view, the same as those caused by arsenic and corrosive sublimate. But there are likewise some peculiarities.

The first symptoms may be violent head ache, then vomiting and cutting pains in the bowels, and afterwards cramp in the legs and pains in the thighs. Sometimes throughout the whole course of the symptoms there is a peculiar coppery taste in the mouth, and a singular aversion to the smell of copper.

Another symptom, which occasionally occurs in this kind of poisoning, and never, it is believed, in poisoning with arsenic or corrosive sublimate, is jaundice. Such are the symptoms when the case does not prove fatal.

When the poisoning ends fatally, convulsions, palsy, and insensibility, the signs in short of some injury done to the brain, are very generally present.

Besides these effects when introduced in considerable doses, and in the form of soluble salts, copper is said to produce other disorders when applied to the body for a long time in minute quantities, and in its metallic or oxidised state. But

*“It is pretty certain that copper, like all other metals, is not deleterious, unless oxidated, and that its soluble salts are by far the most energetic. The sulphuret is equally innocuous with the metal, if pure; but it appears probable that it becomes oxidated by long exposure to the air, and passes into the state of sulphate. The power of the oxides has not been ascertained: they are certainly poisonous; but they are probably not very active, on account of their great insolubility. The hydrated deutoxide is probably more active. But it is chiefly in the soluble salts that we are to look for the full development of the action of this poison. A very small quantity of the sulphate will prove fatal.”—C.

The most common preparations of copper found in commerce, and in the shops are, acetate of copper, (*verdigris*,) binacetate of copper (improperly called *distilled verdigris*,) ammoniuret of copper, and *lapis divina*, which is a preparation of sulphate of copper, nitrate of potassa, alum and camphor, and is used as a collyrium.

the notions entertained on this subject must be received with some limitation.

2. *Of the Treatment of Poisoning with Copper.*

*Albumen** in the form of the white of eggs is the best antidote for the poisonous preparations of copper. *Ferrocyanate* of *potassa* is equally effective; and *metallic iron* is also a good antidote.

On account of its solvent power over the insoluble compounds formed by the salts of copper with animal and vegetable matters, vinegar, which has been frequently used, must be considered injurious rather than useful.

3. *Of the Morbid Appearances caused by Copper.*

The appearances found in the body after death, by poisoning with copper, are chiefly the signs of inflammation. If death takes place very rapidly, however, it is probable that no diseased appearance whatever will be perceptible.

When death ensues more slowly, the marks of inflammation coincide with the signs of irritation during life. Under such circumstances the whole skin, in a case related by Pul, was yellow. The *intestines*, particularly the lesser intestines, were of an unusual green colour, inflamed, and here and there gangrenous. The *stomach* was also green; its inner coat was excessively inflamed; and near the pylorus there was a spot as big as a crown, where the villous coat was thick, hard, and covered with firmly adhering verdigris. The *lungs* are likewise said to have been inflamed. The *blood* was firmly coagulated. In other cases related by Wildberg, the skin on various parts, and particularly on the face, was yellow; but on the depending parts it was livid. The outer coat of the stomach and intestines was here and there inflamed. The duodenum and jejunum, and likewise the gullet,

* Albumen, milk, tea and coffee, are supposed to decompose the solutions of copper. This has been doubted by some toxicologists, who recommended in preference the use of the stomach pump, and afterwards to reduce the excitement by blood-letting.

were in a similar state. The blood in the heart and great vessels was black and fluid.

The intestines have been found perforated by ulceration, and their contents thrown out into the sac of the peritonæum. A case is related where the small intestines were perforated, and several, where the perforation was in the rectum, which portion of the intestines, as well as the duodenum, jejunum and ilium, was also extensively ulcerated.

The existence of the *verdigris* in the form of powder, lining the inside of the stomach after incessant vomiting for three days, is of course an important circumstance in the inspection of the body. But too much reliance ought not to be placed on mere bluish or greenish colouring of the membranes. For it has been observed, that the inside of the stomach as well as its contents may acquire these tints in a very remarkable degree in consequence of natural disease.

Our limits will not permit us to notice a few points in which we are at issue with the author; there is one remark in a note to page 227, however, in which we think that Dr. Ducatel is mistaken; we allude to his attributing the salivation sometimes attendant on the medicinal use of hydrocyanic acid to the presence of mercury in that liquid. That it may contain a small quantity of this substance, when prepared according to the process of Gay Lussac, or of the Dublin college, we are ready to admit, but when the smallness of the dose of the acid is considered, we can scarcely credit that the infinitesimal proportion of mercury contained in these doses can affect the system, and must therefore still attribute the salivation to the acid, especially when we know that some of the other powerful acids, as the nitric, for example, are capable of thus acting on the secretory glands of the mouth.

ART. LVI.—*Botany of the Northern and Middle States; or a description of the plants found in the United States, north of Virginia, arranged according to the Natural System; with a Synopsis of the Genera according to the Linnæan System. A sketch of the rudiments of Botany, and a Glossary of Terms.* By LEWIS C. BECK, M. D., Professor of Chemistry and Natural History in Rutgers's College, N. J. &c. Albany, 1833. pp. 471, 12mo.

A KNOWLEDGE of the internal resources of every country is admitted to be an object of the most paramount importance; now, as these depend in a great measure on its vegetable productions, we always owe a debt of gratitude to such of our fellow citizens as devote themselves to the investigation of our native plants. An ambitious naturalist may amuse himself with framing a new system, or in exploring the neglected wilds of a distant country; but those whose researches are guided by a love of utility, will better attain their aim by developing and elucidating the history and qualities of the productions of our own fields and forests.

Several valuable works have already appeared in this and in other countries on the plants of the United States, some on an extended scale, and others of a more local character. The publication which now solicits our notice is restricted to those native vegetables which are found in the states north of Virginia, and is intended, to use the words of its author, "to furnish a description of the plants of which it treats, adapted to the present state of botanical science."

With this view, he has followed the natural mode of arrangement, which has been so much neglected by our botanists; for although we by no means consider it as an unerring guide, it certainly opens new fields of inquiry, and enables us to arrive at conclusions which would never be attained by the sexual system. In the genera, some alterations have been made which in general are judicious, but in other cases appear to us as unnecessary.

We have neither the time nor the space to go into an ex-

amination of the work in detail, nor would it comport with the general character of these notices. There is one point, however, to which we would draw the attention of the author; as his work is intended as a text book for the beginner, it would have added much to its value if he had subjoined the derivations of the generic names; this has been done with success by Dr. Darlington, in his admirable Flora of Chester county.

We have noticed many errors of the press, and some of inadvertence, as in the introduction the same species in two places; but in the general, the work is correctly printed, and is of a convenient size. We can recommend it to the young botanist as a most valuable text book.

ART. LVII.—*Dictionnaire de l'Industrie Manufacturiere, Commerciale et Agricole. Ouvrage accompagne d'un grand nombre de figures intercalees dans le texte &c. Tom. 1er. contenant 174 figures. Paris. 1833. pp. 618. 8vo.*

THE plan of publishing dictionaries or encyclopedias on all, or each of the sciences, has been more followed in France than in any other country, and has been attended with very advantageous results. In fact, few modes of diffusing knowledge are better adapted for the purpose than that of dictionaries; the information contained in them can be referred to without difficulty, from their alphabetical arrangement, added to which a variety of useful matter can be introduced into them, which would be out of place in any other species of publication. If well conducted, they give us an abstract or condensed view of the science or sciences to which they are devoted up to the day of publication, thus enabling the student to keep pace with the rapid advance of knowledge, without entailing on him the expense of a large library, or what is perhaps of equal importance, the loss of time required to collect from the numerous publications daily issuing from the press the few new facts each may contain.

The present work takes a different ground from any other, for although allied in some respects to the *Dictionnaire Technologique*, it embraces a wider field of action, as it professes to treat not only of the arts, and their alliances with the sciences, but also of the relations which exist between these arts and legislation, noticing also the effects of each on public or private health. It also gives an explanation of all the technical terms used in the different arts and sciences. This it must be evident, cannot fail of including the discussion of a vast number of questions of great interest to the chemist and pharmaceutist; indeed, the best articles in the present volume, as far as we are enabled to judge, are those on chemical subjects, and are principally from the pen of M. Gaultier de Chau-bray; among these we would particularly notice that on the manufacture of sulphuric acid by the perpetual process; this is accompanied with plates exemplifying the buildings and apparatus, by means of which 300 of acid may be obtained from 100 of sulphur.

To such of our readers as are familiar with the French language, we can recommend this work with confidence, judging from the specimen before us, and the high attainments of its conductors.

SELECTED ARTICLES.

ART. LVIII.—*On the Filter Press of Real, its mode of action and inconveniences, and a more simple means of obtaining the same results.* By MESSRS. BOULLAY, Senr. and Junr.

THE best plan that has hitherto been devised to extract the soluble principles from vegetable powders, is the filter press of Mr. Real, yet this apparatus is seldom used from the inconveniences attending its employment.

This apparatus essentially consists of a long tin box to receive the moistened powder, and a vertical tube capable of containing a column of water to press on the powder. The fluid with which the tube is filled forces out that mixed with the powder, under a pressure corresponding to the height of the column. This very height is a serious inconvenience, and a column of mercury has been substituted, but without remedying the evil. Another drawback to the use of this instrument is that it is very liable to get out of order. The whole mode of action of the filter press may be explained as follows:—When a powder saturated with water, but not forming a paste with it, is placed in a recipient analogous to that of the filter press of Mr. Real, and a column of water is made to act on it, this water traverses the powder, driving before it the fluid with which this latter had been saturated, and completely replaces it without mixing with it. What advantageous results are to be obtained by a knowledge of this fact? Let us suppose a powder capable of retaining twice its own weight of water, as saw dust for example, be mixed with four times its weight of this fluid, this mixture stirred often for some hours, so that every portion of the powder may be moistened, and then we endeavour to collect the products by different processes to ascertain which is the most advantageous.

By simple expression in a cloth, we shall not obtain

three-fourths of the liquid used to moisten the powder. By means of a common press we will obtain exactly three quarters of it. By the use of the filter press of Real, on the contrary, a quantity of fluid equal to twice the weight of the powder will be separated, when the flow of it will be checked. If the column of water be now made to act on it, we will be enabled to obtain the remainder of the fluid originally added to the powder.

In fact, the advantage of Mr. Real's method over every other, consists in permitting us to extract to the last drop any fluid with which a powder had previously been saturated, and which had become charged with its soluble principles. It also consists in the use of the smallest quantity possible of a solvent, and the clearness or limpidity of the products.

Now these important results are wholly independent of the pressure of the column of water, for they may be obtained by the mere superposition and weight of the quantity of water necessary to completely displace the fluid originally combined with the powder; in short, by the weight of a volume of water equal to that of the fluid to be displaced. Thus, for example, if we place a powder saturated with water in a funnel, or moisten this powder in the funnel so as to saturate it, every drop in excess added at the surface will cause the escape of one at the bottom.

If a volume of water equal to that in union with the powder be added at once, it will displace the latter as completely and in the same manner as in the apparatus of Mr. Real. This result takes place with other fluids also, whatever may be their relative density; thus water will displace wine, and be displaced in turn by that fluid. Oil is displaced by water, though not entirely, and *vice versa*. Atmospheric air will partly displace water, but is wholly displaced by it, as may be proved by the following experiment:—If a powder be put into a funnel, and water cautiously poured upon it so as to cover its surface with two or three lines in depth, no air will escape through the fluid, but the whole of it will be driven off at the lower extremity of the funnel. The results are, however, somewhat different according to the nature of the fluids ope-

rated upon. Thus when the fluid in union with the powder and that used to displace it, are capable of mixing together, the displacement will be complete, and if any mixture of them does take place, it is so limited as not to affect the general result. But if the fluids are incapable of mixing together, the displacement will be incomplete; thus water will not wholly displace oil, except by repetitions of the process.

From what has been said, the simplicity and importance of this plan of obtaining the soluble principles of powders must be evident. All that is required is a funnel, the lower orifice of which is to be stopped by a dossil of cotton, the powder is then to be introduced and saturated with the desired solvent; after it has taken up the soluble portions of the powder, it is to be displaced by another portion of the same fluid till the powder is exhausted. It is necessary, however, to pay attention to the following rules:—

1. The powder operated on should not form a paste with water.

2. The displacement is rapid or slow in proportion to the tenuity or coarseness of the powder, and to the lightness or looseness with which it is pressed into the funnel.

3. The quantity of fluid retained is in proportion to the noncompression of the powder.

4. As a general rule, it is better to employ rather coarse powders, and to compress them but slightly.

5. The fluids are to be used hot or cold, according to the nature of products, and of the solvent employed.

6. To obtain the most concentrated solution, the fluid must be gradually poured upon the powder, and the products separated. The first portion that passes through is at the highest point of concentration.

Where it is necessary to operate with closed vessels, an apparatus resembling the French coffee pot (*caffetière à la Dubelloy*) is the best; it may be made of tin, porcelain &c. It should be noted that the recipient for the powder should be long, narrow, and terminated below in a conical form, which may be furnished with a stop cock, so as to permit a ready division of the products. If this stop cock be jointed to the

recipient by means of a glass tube, it will afford a sure mode of separating the fluids which are incapable of mixing together, where one has been used to displace the other.

In a subsequent memoir on the application of this process, Messrs. Boullay make the following just observations on the formulas for tinctures &c.:—"After having indicated the relative proportions of substances to be employed, the manner of operating, these directions usually finish with the words *strain* and *filter*; without taking into account the portion of fluid retained in the powders &c.; which is as fully saturated as any other part of it. When extracts are made, large quantities of the solvent are used, requiring a tedious evaporation &c." All this is remedied by operating by displacement, as is fully shown by the experiments of the authors on the different preparations of cinchona.

Journ. de Pharm. June and August.

ART. LIX.—*On the Aromatic Roots and Seeds of the Scitamineæ*. By N. J. B. G. GUIBOUT.

On the Costus.—Authors are divided on two fundamental questions respecting this root: is it the product of the *C. Arabicus*. Lin.; or of the *C. speciosus*. Willd.? Is it identical with that known to the ancients under the same name?

The root of the *C. speciosus*, which is the *tsjana kua*, Rheede, (Hort. Malabar, xii. t. 8.) the *C. Arabicus*, Jacquin, (Icon. plant. rar. 1. f. 1.) and probably also the *HERBA spiralis*, Rumphius, (Amboyna, vi. t. 64.) has no analogy to the Arabian costus of our shops. The contrary opinion is founded only on the assertion of Commelin, who does not appear to know the last mentioned article, as he says it has a pleasant taste, and is fibrous: whilst on the other hand, Roxburgh, (Asiatic Researches,) Ainslie, (Materia Indica,) and Batka, (Journ. Pharmacie,) have all pointed out the differences which exist between the costus of the shops and the root of the *C. speciosus*. This latter is knotty or articulated, creep-

ing and producing many bulbs, has scarcely any taste, but a slight odour, and is furnished with a great number of fibres. The bark cannot be separated, but in time it becomes split into numerous threads, (Rheede.) The costus of the shops now, as formerly, is an almost perpendicular root, often times bifurcated at its lower part, not articulated or fibrous, terminated above by a collar and often presenting the remains of the stem, (Clusius Exot. 205.) Its smell is somewhat like that of the orris root, mingled with a goat-like odour. Its taste is bitter and slightly acrid.

Not only this root cannot belong to the *C. speciosus*, but also after having examined all the genera and species of the family of the Scitamineæ, as given in the magnificent works of Roxburgh and Roscoe, I would say that the costus of the shops does not appear to belong to any plant of this family. Mr. Batka, who is also of the same opinion, thinks that it may belong to an Irideæ. I mentioned to this gentleman, that a merchant of Paris bought, a few years since, at a very low price in London, about twenty pounds of costus, which had been lying in the East India Company's warehouse under the name of *iris root*; but on the one hand, this name might have been given it, from its odour; and on the other, the well known conformation of the roots of the Irideæ precludes our attributing the root of the costus to this family.

If I may hazard a conjecture, I would say that our costus appears to be the root of an Umbellifereæ, not that it must necessarily be that of the *PASTINACA opopanax*, which Matthioli calls *bastard costus*, though perhaps those who have substituted the roots of the opopanax or angelica for the true costus, were nearer the truth than those who have attributed the latter to a plant belonging to the Scitamineæ. As to whether our costus is that of the ancients, it appears from the descriptions of Dioscorides, Pliny and Galen, that their root was derived from India or Arabia, and had a strong and agreeable smell, was moderately heavy, whitish, of a warm and somewhat bitter and acrid taste, and might be adulterated with elecampane. This agrees with our root, added to which Garcias states, it is the only one known to the Turk-

ish, Arabian and Persian merchants and physicians, under the name of *cost* or *costi*.

It is true, Dioscorides and Pliny have mentioned many kinds of *costus*, but their descriptions having been written at a distance from the native habitats of this root, it is probable that the others were adulterations of the true article, or substitutes for it, as at present we have three barks from America, called *costus acris*, *costus dulcis*, and *costus amarus*, which have no affinity with the true article.

GALANGA.—The care taken by Ainslie in his *Materia Indica*, to distinguish the root of the greater galanga from the smaller, has proved to me that I have confounded (Hist. des drogues) under the former, two different roots. To elucidate this subject as much as possible, I will first state that Garcias only recognized two kinds of galanga, one (minor) coming from China, where it is called *lauandon*, and another (major) thicker, but of more feeble properties, from Java, where it bears the name of *lancuas*. Both are called *lanquas* in India. Rumphius has distinguished two kinds, the *major* and *minor*, of the former of which there are two varieties, a red and a white. The former of these is covered with brown pelicles, is red at the bulb which supports the stem, and of a dirty white within. The second is externally whitish, rarely spotted with red at the bulb, and white within. Both are about an inch and a half thick, hard, fibrous and yet somewhat succulent; they have an aromatic, somewhat pungent smell, and a burning taste; they are both equally ligneous, brown externally, and of a gray colour within.

According to Rumphius, the *galanga minor*, as known in Europe, differs from the *lanquas minor* of India. The root of this is knotty, solid and flexible, like the preceding, but is much smaller, being only about the size of the middle finger; it is neither brown nor red, and might be confounded with ginger by inexperienced persons, if it were not thinner and less flexible. Its taste and smell are similar to those of the greater kind, but stronger. Added to which, our author says, more than once, that the lesser galanga of the shops should not be

confounded with the *lanquas minor* of India, which is not red, but whitish, and he thinks none of it reaches Europe.

As before observed, Ainslie makes a great difference between the greater and lesser galangas. The first is the *lanquas* of Garcias, the *lanquas major* of Rumphius, and the root of the *ALPINIA galanga*, Willd. (*MARANTA galanga*, L.) It is brownish externally, white within, and of a smell and taste much weaker than the lesser galanga, which is the *lanquas kitsjie* of the Malays, and the *lauandon* of the Chinese; it is blackish brown externally, reddish within, and has an acrid aromatic, slightly bitterish and burning taste; Ainslie asks whether this root is derived from a *costus*, an *amomum*, or some other plant.

I possess the following kinds of galanga.

1. *Galanga minor*, lesser galanga, (Hist. des drogues,) two to four lines in diameter, of a blackish brown on the exterior, with fimbriated circular rings. This root is represented by Clusius, (Exot. p. 211. f. 2.) and by Rumphius, (Amboyna, l. 5. t. 63. f. D.)

2. *Galanga medius*, or middle galanga, described in the *History of Drugs* as *grand galanga*, from its being known under that name in commerce. The only change to be made in the account of it, is that its size only varies from six to eight lines, and that it is not to it, but to the next species, that the name of *acorus* has been erroneously applied.

3. *Galanga major* of Ainslie, Geoffroy and Garcias. This root is one or two inches large, jointed or ramified, reddish externally, white within, and of very faint smell and taste of galanga; it is, however, very old. It is represented in Clusius (Exot. p. 211. f. 1.)

4. *Galanga levis*, (false galanga,) *History of Drugs*. This root appears to me to be represented in Rumphius t. 63. f. A, hence I am inclined to believe that it is the *G. major* of Ainslie and Rumphius, gathered young. However this may be, these four kinds appear to me to constitute but two distinct species:

1. The *G. minor* and *G. medius* are probably produced by the same plant, which is but little known.

2. The true *G. major*, or root of the *ALPINIA galanga*, Willd., to which may be joined as variety the *G. levis* of the *History of Drugs*.

CURCUMA.—Mr. Fee has made a just observation respecting this root, that its *round* and *long* varieties are produced by the same plant, or by two varieties of the same plant, which appears to be the *CURCUMA longa*, Lin., and that even if they are the product of different plants, the round curcuma ought not to be attributed to the *C. rotunda*, L.; this plant is, in fact, generally regarded as the same as the *manja-kua* of Rheede, the *ZERUMBED claviculatum* of Rumphius, and the *KÆMPFERIA pandurata*, Roscoe, and these plants are entirely different from the true curcumas so well described in the admirable work of Rumphius.

According to this author, the *curcuma* and the *tommon* (Zedoary,) form a separate genus of plants, the species of which are often confounded together. He distinguishes two kinds of curcuma; one cultivated, the other wild. The first furnishes numerous varieties, which are divided into two subspecies, a *major* and a *minor*. The first (*Curcuma domestica major*) is a plant whose root produces four or five petiolated leaves, which appear to form a sort of stipe, and are about eighteen inches long, not including the petiole, and six inches broad. They are acuminate at both ends, marked with oblique furrows beneath, are glabrous, of a fine green colour, and odorous on being handled.

The flowers are not disposed in a close cone, arising from a naked footstalk, as in the gingers, but in a loose central head, formed of semi-concave, imbricated, open bractes, which are greenish at their edges; afterwards becoming of a pale brown, especially in the wild plants. The root is composed of three distinct parts—first, a central tubercle, placed directly under the scape, of the size of a walnut, and called by the Malays *kumjit*, which means, *curcuma*. From this tubercle arise four or five others, of about the size and form of the finger, giving an appearance of a half closed hand; these elongated tubes constitute the second portion of the root. The third is composed of radicles arising for the

most part from the central tubercle; they are about five or six inches long, and sometimes furnished at their lower extremity with a white tubercle, which is succulent, insipid, and resembles an olive in form. It is evident that these last mentioned tubercles do not form part of the turmeric of commerce; but Rumphius states that the central one is dried for sale as well as its digitate appendages. When deprived of an external pellicle, which readily separates, they are of a gamboge colour, and have a peculiar ointment like smell and taste, with a slight acrimony mixed with bitterness.

The *Curcuma domestica minor* is smaller than the preceding, its leaves being only fourteen inches in length, comprising the petiole, and four inches in breadth. They possess a very strong odour of turmeric; the root is formed of one or two central tubercles, surrounded by a great number of digitate and recurved appendages, themselves giving rise to others, thus forming a tuberculous mass of some size. The digitate appendages are thinner than in the former species, and when deprived of their pellicle and fibres are smooth, as if polished by art. Internally they are of a dark yellow, have a mild but permanent taste, and a peculiar aromatic odour; a slight acrimony, but no bitterness.

Rumphius then describes the *wild curcuma*, whose root is only divided into two or three nodosities, with no digitate appendages, but having a great number of fibres or radicles, to which are attached round tubercles, resembling filberts. The root is yellowish gray externally, whitish within, with a yellow centre, almost inodorous and of a bitterish taste. It is not made use of.

The turmeric of commerce is composed of three or four kinds of tubercles, namely:—

1. *Curcuma rotunda*.—Round, oval or turbinate tubercles, about the size of a pigeon egg, of a dirty yellow colour externally, and of that of gamboge within. Every tubercle when entire is furnished near one of its extremities with a certain number of concentric circles or rings, which are the vestiges of the insertion of leaves, and at the other extremity with cicatrices arising from the rupture of the lateral appendages.

It is therefore evident that these tubercles are the *mother of curcuma* of Rumphius; and their resemblance with gamboge, their odour, ointment-like taste and slight acrimony mixed with bitterness, demonstrate that it must be referred to the *curcuma domestica major*.

2. *Curcuma oblonga*.—Elongated tubercles, which from their colour, smell and taste, evidently belong to the same root as the above, and are only its lateral appendages. These are not cylindrical as in the next kind, but are always largest in the middle, so that they present an ovoid appearance, between that of No. 1 and No. 3. There can be no doubt that they are the lateral appendages of the root of the *Curcuma domestica major*.

3. *Curcuma longa*.—Cylindrical tubercles, longer than the preceding, sinuous, not thicker than the little finger, externally gray, sometimes a little greenish, never yellow, internally of so deep an orange as to appear red or brown, more aromatic than No. 1, resembling ginger; taste very aromatic with no bitterness. These are furnished by the *C. domestica minor*.

4. Finally, we find in the turmeric of commerce, round tubercles about the size of a filbert, presenting vestiges of two foliaceous stripes, externally resembling the preceding and having the same properties. These are the main roots of No. 3.

I think it indispensable that the systematic name of these two varieties of the plant should be changed. The name of *C. domestica* is not sufficiently distinctive, and is as applicable to a Zedoary; that of *C. rotunda* or *longa* is still worse, not only because the same plant produces both, but also from the uncertainty caused by the Linnæan nomenclature.

In fact, in the first editions of the *Species Plantarum*, the *C. domestica major* is given as a synonyme of *C. rotunda*, whilst in all the others the *C. rotunda* is considered as identical with the *manja-kua*, Rheede, (*Kæmpferia pandurata*, Roscoe,) and the *C. domestica major*, given as a synonyme of *C. longa*.

On the other hand, almost all authors give, as another sy-

nonym of *C. longa*, the *C. radice longa*, Herrmann, (*Hort. Lug. Bat.* 208,) and it is evident that this plant, copied by Blackwell and Pomét, is not the true officinal turmeric. Finally, Jacquin and Murray have recognized the true plant of Rumphius, and separated it from *C. longa*, under the name of *Amomum curcuma*, but as it is a *Curcuma* and not an *Amomum*, the name of Jacquin cannot stand. Considering therefore that this species is distinguished from all the others by the abundance of its colouring principle, and by its use in dying, I propose to give it the name of *C. tinctoria*, and the only synonymes of it I know are:—

Amomum curcuma, Jacquin. *Hort. Vindebon*, 3. t. 4.
Murray, *Syst. Veg.* ed. 15.

C. radice longa, Zanon. *Hist. Plant.* t. 59.

C. domestica major and *minor*, Rumphius. *Amboyna*, v. 2.
p. 162.

ZEDOARY. Zedoary was unknown to the ancients, without it be the same, as is supposed by some authors, with the *Syrian costus* of Dioscorides. It would be idle at the present day to attempt to decide this question; it is enough to say that our round zedoary is described by Serapion under the name of *zerumbet*.

The long zedoary, which is perhaps the *geiduar* of Avicenna, has been for a very long time the most common in commerce, and is the only officinal kind. The round, on the contrary, was very rare in the time of Clusius, who having seen it in Antwerp, described and figured it. At present, the round kind is almost the only one found in Paris.

Many authors have considered the two zedoaries as parts of the same root; among others, Pomét, Dale and Bergius. In the History of Drugs I have combatted this opinion, grounded on the fact that we sometimes see the round zedoary furnished with short round prolongations, which were not the long zedoary, but having lately examined the numerous *curcumas*, figured by Roscoe, I perceived that the same plant might produce both kinds of roots, the round being the large tubercles named by Rumphius *matricis radices*, and the long, the digitate appendages attached to the former. On the

other hand, so many of these plants furnish similar roots, among others the *C. zedoaria*, *C. aromatica*, *C. amada* &c., that it is difficult to say whether one of them exclusively produced the two zedoaries of commerce, or whether they were not the roots of different species.

Linnæus, in accordance with the authors that preceded him, attributed the round zedoary to the *Colchicum zelamicum* of P. Hermann, (*Malan-kua*, Rheede,) to which he gave the name of *Kæmpferia rotunda*; but if we compare our round zedoary with the roots of *Kæmpferia* and *Curcuma* we will be convinced that it can only be the central tubercle of the root. Anteriorly to Linnæus, Hermann described the true zedoary in his *Hort. Lug. Bat.* under the name of *Zedoaria zeylanica camphoram redolens*, and at a later period, Bergius received it from Cochin China, where it had been collected by Loureiro, and recognized it as the *kua* of Rheede, and called it *Amomum scapo nudo, spica laxa truncata*. This plant has successively become the *AMOMUM latifolium*, Lamarck, *AMOMUM zedoaria*, Willdenow, *CURCUMA zerumbet*, Roxburgh, and finally *CURCUMA zedoaria*, Roscoe.

Ainslie, in his *Materia Indica*, distinguishes three species of zedoary, but appears to me to be completely mistaken as regards them.

1. *Zedoary of Kæmpfer*, or round zedoary, produced by the *KÆMPFERIA rotunda*. I have just said that our round zedoary cannot be derived from this plant.

2. *Zedoary zerumbet*, produced by the *CURCUMA zerumbet*, Roxburgh, which Ainslie has made synonymous with the *AMOMUM zerumbet*, Willdenow, and the *lampujum*, Rumphius. The error here consists in the *C. zerumbet*, Rox., which really produces the zedoary, being synonymous with the *Am. zedoaria*, Willd., whilst the *Am. zerumbet*, Willd., or *lampujum*, Rumphius, produces a root which has been described under the name of *zerumbet*, but it is not now found in commerce. All the rest of the article partakes of this confusion, and M. Fee commits the same errors in his article *gingembre zerumbet*.

3. *Turmeric coloured zedoary*. This root must be our yellow zedoary, it is erroneously considered by Ainslie as the

long zedoary of the Edinburgh Dispensatory; but this, notwithstanding the dark colour of its interior must be identical with our long zedoary. Ainslie attributes this kind to *CURCUMA zedoaria*, Roxb. (*C. aromatica*, Ros.) I am doubtful of this, for the faint yellow colour of the root of this plant does not appear to correspond to that of the yellow zedoary; besides there is another plant which produces it.

Roscoe also states, that Sir J. Banks is of opinion that the root of *C. zerumbet*, Roxb. was the true zedoary of the *materia medica*, and that the root of *C. zedoaria*, Roxb. was the round kind. Thus Roscoe admits, that the long zedoary is produced by the *C. zerumbet*, Roxb. which he therefore terms *C. zedoaria*. But I know not why he is inclined to attribute the round zedoary to the *KÆMPFERIA rotunda*. If this plant produces a zedoary, it certainly is not the round zedoary of commerce. The following are the most certain synonymes of the two zedoarias.

1. *Zedoaire longue*, Hist. des drog. simp. No. 174.

Zedoaria longa, Matthiolus, Lemery, Bauhin, Dale and Geoffroy.

Zedoare, Pomet.

Curcuma zedoaria, Roscoe.

C. zerumbet, Roxburgh.

Amomum zedoaria, Willdenow, *Species Plantarum*.

A. latifolium, Lamarck, *Ency. Met.*

A. scapo nudo, spica laxa truncata, Bergius, *Mat. Med.* 4.

Tommon itam, Rumphius, *Amb.* v. 169.

Kua, Rheede, *Hort. Mal.* 11. t. 7.

Zedoaria zeylanica camphoram redolens, Hermann, *Hort. Lug. Bat.* 636.

2. *Zedoare ronde*, Hist. des drog. simp. No. 273.

Zerumbet, Serapion, Pomet.

Zedoaire ronde, or *zerumbet*, Lemery.

Zedoaria rotunda, Matthiolus, Dale and Geoffrey.

Z. rotunda et *Z. tuberosa nigricans*, C. Bauhin, *Pin.* 36.

Z. tuberosa, Clus. *Arom. Hist.* 1. c. 43.

YELLOW ZEDOARY. This root, as described in the "History of Drugs," closely resembles the round kind, in its radi-
cal and the disposition of its cylindrical prolongations. As

I then said, it must be derived from a plant of the same genus, and we have seen that Ainslie attributes it to the *C. zedoaria*, Roxb., but I think that it is produced from the *Tommon*, Rumphius, v. 168. In fact it is difficult to find two descriptions which agree better than that in the History of drugs, and that of the *Tommon*, by Rumphius.

This plant is figured pl. 68, Rumphius, and has been erroneously supposed by many authors, and especially by Roxburgh and Roscoe, to be the same as the *C. zedoaria*, Ros. (*Kua*, Rheede;) it differs by its spike of flowers which springs from the midst of the leaves as in the true curcuma, whilst in the *C. zedoaria* the flowers are borne on a naked scape. A specific name should be given to this *tommon* which resembles greatly, it is true, the plant I term *C. tinctoria*, but differs from it in the enormous size of its leaves, and the different character of its root.

The long, round and yellow zedoaries, with ginger, and the two turmeric, are the only roots of this genus I have met with in commerce. It appears, however, that there are others which it is necessary to mention to remedy the confusion which has existed.

The first is the *zerumbet* or *Zingiber sylvestre*, Garcias, (*Arom. Hist.* t. i, c. 43, the *Zerumbet*, Geoffroy; the *Zingiber latifolium sylvestre*, Hermann, (*Hort. Lug. Bat.* 635;) the *lampujum*, Rumphius, *Amboy.* v. t. 64;) the *katou-inschi-kua*, Rheede, (*Hort. Mal.* t. 13;) the *Amomum zerumbet*, Linnæus, Jacquin (*Hort. Vind.* 3 t. 54) and Willdenow; the *Amomum sylvestre*, Lamarck; and the *Zingiber zerumbet*, Roxburgh and Roscoe.

The second is the *Cassumuniar* of Geoffroy, who thus describes it:—Root tuberous, of the size of the thumb, in transverse slices, and surrounded with circular lines like the galanga; of an ash colour externally, and yellowish within. This root appears to bear the same relation to the preceding that the yellow does to the round zedoary; it differs from it in colour; it appears to be the produce of the *ZINGIBER cassumuniar*, Roxburgh and Roscoe; a plant closely allied to their *Z. zerumbet*.

The third root in the *gedwar*, Clusius, (*Exot. auct.* 378.) The figure given by this author, who is always exact, does not permit us to confound the *gedwar* with any of the preceding roots. It is difficult to say whether it is the product of a *Curcuma* or a *Kæmpferia*.

CARDAMOMS. Independently of the five species of Cardamoms mentioned in the "History of Drugs," I have discovered a sixth, and this discovery has tended to elucidate this hitherto obscure subject. All these kinds of cardamoms being described or figured in many works, I shall restrict myself at present to the explanation of their synonymy, as every one can readily recognise the species by means of the descriptions and still better by the figures alluded to.

1. ROUND CARDAMOMS. *Cardamome rond.* (*Hist. des Drog.* No. 613.)

This species is accurately described by Pomet, p. 39, and faithfully represented by Clusius, (*Exot.* p. 377,) and by Elizabeth Blackwell (*Herbal*, t. 371.) On comparing these two figures which indicate a sessile fruit in close bunches, with the figures of the *Elettari*, Rheede, (*Hort. Mal.* ii. t. 4, 5, 6,) it is evident that this plant does not produce the round cardamom. The only plant that can and in fact does produce it is the *Amomum cardamomum*, Roxburgh, (*Pl. Corom.* 3, No. 201,) the *Cardamomum minus*, Rumphius, (*Amboy.* 5. t. 65. fig. 1.) It is also the *A. cardamomum*, Linnæus and Willdenow; but the synonymes taken from Rheede and Blackwell must be expunged.

2. LESSER CARDAMOMS. *Petit cardamome* (*Hist. Drog.* No. 614,) *Cardamomum minus* of Matthioli, Clusius, Lemery, Pomet, and Geoffroy.

This fruit is represented by Matthioli, Clusius, (*Exot.* 187,) Blackwell, (*Herbal*, fig. 22,) and not by Gærtner, who, under the name of *C. minus*, appears to me to have figured the preceding species.

So many authors now agree that this cardamom is produced by the *Alpinia cardamomum*, Roxburgh, which is the *Amomum repens* of Sonnerat and Willdenow, and the *Amomum racemosum*, Lamarck, that I dare not oppose this opinion.

If, however, I followed my own bias, I should say that the lesser cardamom was the product of the *Elettari* 2, of Rheede, (11 t. 6,) the round fruits of which, destitute of any fibrous appendage, appear to me the only ones which would assume in drying, the rounded-triangular form of our lesser cardamom. This plant was called *Amomum grana-paradisi* by Linnæus, under an erroneous impression that they produced the grains of paradise, and he made a distinct species of it. Lamarck has only made it variety B of his *Amomum racemosum*.

3. MIDDLE CARDAMOMS. *Cardamome moyen*, (*Hist. Drog.* No. 615.)

I do not know of another representation of this species than that of Blackwell, t. 584, fg. 17, 18, 19. Whatever may be its external resemblance with the preceding, it may always be distinguished by the whiteness of its shell, and the red colour of its seeds. The plant that furnishes it may only be a variety of the preceding.

4. GREATER CARDAMOMS. *Grand Cardamome*, (*Hist. Drog.* No. 616.)

Cardamomum medium, Matthiolum, Pomet and Geoffroy.

C. medium seu *majus*, Lemery.

C. majus officinarum, Bauhin. *Pinax*, 413.

C. majus vulgare, Clusius. *Exot.* p. 187.

C. majus, Murray. *Apparatus*, v. 63.

C. ensal, Gærtner. *Fruct.* t. 12.

Blackwell. *Herb.* t. 584, fg. 14, 15.

This fruit is well represented in Clusius, Blackwell and Gærtner. In a German work entitled *Vollstaendige sammlung offizineller pflanzen*, I find it stated that the *C. ensal*, Gærtner is a new species or variety which Roxburgh calls *Alpinia cardamomum medium*.

5. ELETTARI CARDAMOMS. *Cardamome elettari*.

At one time this kind must have been abundant in commerce, for I found at the establishment of Mr. Pelletier a jar almost full, which appeared to have formerly occupied a place in his shop, as if in common use. This cardamom is that represented, pl. 4, 5, Rheede, (see particularly fg. N. O.

pl. 5,) which show both the recent and dried fruit; these figures are copied in Blackwell, t. 385, fg. 1, 2, t. 584, fg. 5, and t. 585. Their striking resemblance, to these figures, whilst it pointed out to me the origin of these cardamoms, also convinced me that these figures could not represent the lesser cardamoms, as every author has hitherto admitted, and by a natural consequence, I doubted whether the *Anomum repens*, Sonnerat, *Alpinia cardamomum*, Roxburgh, which are so closely allied to the *Elettari* 1, of Rheede, produced it. Besides these two authors could not know exactly what we called *Lesser Cardamoms*.

This cardamom may be described as follows:—Shell of a reddish gray, darker and browner than that of the greater cardamoms; it always presents on its surface the vestiges of a dry fibrous husk, which is wanting in the other cardamoms. It is about ten to fifteen lines in length, and five to seven in breadth, having sometimes the form of a cocoa nut enveloped in its husk, and at others that of a clove of garlic. Many years since, these shells, deprived of their seeds, were given to me as those of the grains of paradise, and I described them as such in the second edition of the History of Drugs, No. 617. In this article, then, the description of the shells belongs to the Cardamon *elettari*, and that of the seeds to the grains of paradise. What led to this error is that the seeds of the *C. elettari* resemble greatly the grains of paradise, both in form and size. Thus whilst the lesser cardamoms has brownish seeds wrinkled at the surface, like cochineal, the middle cardamoms red seeds, and the greater cardamoms white and very angular seeds, the *C. elettari* has them more rounded and of exactly the same size as the grains of paradise; but their surface is of a dull grey colour, and their cardamom smell, and terebinthinate but not acrid or burning taste, range them among the cardamoms, and separate them from the grains of paradise.

6. GRAINS OF PARADISE. *Maniguette ou Graine de Paradis*.
Cardamomum majus, Matthiolus, Pomet and Geoffroy.
C. piperatum, Cordus. The best name for this species.
Grana paradisi officinarum, Bauhin, *Pinax*, 413.

Amomum angustifolium, Sonnerat. Voyage aux Indes, t. 137.

A. madagascariense, Lamarck. *Encyclop. Met. Bot.* 1. p. 133, t. 2, fig. 1.

Zingiber meleguetta, Gærtner. *Fruct.* t. 12.

Blackwell, t. 584, fig. 10, 11, 12, 13.

The figures of Sonnerat, Lamarck and Gærtner, represent the recent fruit, those of Blackwell the dry. I think that the figure given by Clusius, (*Exot.* 37, fig. 314,) also refers to the same fruit, notwithstanding the differences pointed out by the author, which I believe to be accidental. The same may probably be said of pl. 584, fig. 9, of Blackwell as also of pl. 385, fig. 4 and 5 *ter* of the same author, though it is possible that these latter may belong to some closely allied species.

The dry capsule of the grains of paradise, is oval, presenting three obscure rounded angles, is about 18 lines long, as thick as the thumb, and terminated above and suddenly by a fibrous prolongation, about three or four lines thick and six long, well represented in Blackwell, t. 584, fig. 10. This capsule is grayish-brown externally, rugose, and, as if formed of a thin dried husk, it is about a quarter of a line thick, firm, polished internally, and divided into three cells, by three thin membranous partitions, which unite at the axis. These membranes on being separated from the capsule, let us see that this is filled with a single dry, white, pulpy mass, described by Lamarck, (*Encyclop. Met.* i. 33,) and well represented by Blackwell, (t. 584, fig. 12,) containing in as many small separate cells, angular, rounded, red seeds, having an unequal, shining surface, inodorous, and of a peppery taste.

I confess, that after having ascertained so exactly the plant and fruit of the *grana paradisi*, described by the above cited authors, I cannot understand how Mr. Batka should promise to publish the plant which furnishes the *true* grains of paradise, viz. the *Amomum grana paradisi* of Azfelsius, (*Journ. de Pharm.* 16, p. 296,) for if this *amomum* is that of Linnæus, it is only the *Elettari* 2 of Rheede, and the seeds of this are certainly not grains of paradise. What surprises me still

more is, that Mr. Batka appears to think that the grains of paradise differ from the ancient *Cardamomum majus*, with shining seeds. I think they are the same.

I also regret to be obliged to say that Roscoe is in error in congratulating himself on having been the first to publish the plant which furnishes these seeds. Even in admitting that the *Amomum meliguetta*, Roscoe, cultivated at Demarara, produces similar seeds, it is not less certain that the *A. angustifolium*, Sonnerat, produces the true article, and as this plant grows in places from whence we derive the grains of paradise, it is evident that the verification of the fact and the priority are in favour of Sonnerat.

Jour. de Chim. Med.

ART. LIX:—*On the influence of Oxygen in the preparation of Volatile Oils and distilled Waters.* By J. S. DESMAREST.

It was long since remarked that certain plants afforded more volatile oil before than after they had been dried. This was verified by Baumé as regarded the *origanum*. On the other hand, it was also found that in the distillation of fresh plants it made a difference whether the operation was commenced with cold or with boiling water; in the first case more volatile oil was obtained, and the distilled waters were turbid, whilst in the second case, less volatile oil was afforded, but the distilled water was limpid and odorous. I am ignorant whether a satisfactory explanation of these facts has ever been given, and hazard the following, hoping it will merit the approbation of chemists.

It is generally admitted that the separation of volatile oils by distillation is a mere effect of saturation; hence when an excess is obtained, it is assumed that this excess existed in the plants. This opinion is founded on the idea that distilled waters are merely solutions of volatile oils, and supposes that we obtain these bodies, without alteration, but if

we reflect on the extreme facility with which volatile oils are altered by contact with oxygen, we will be led to the conclusion that this effect is much less limited than has been supposed, and that it commences the moment this contact takes place; hence nothing will prevent our assuming that the separation of volatile oils is owing to the insolubility thus communicated to them.

Thus, when a dried plant is distilled with water, the volatile oil, having undergone an alteration by its prolonged contact with the oxygen of the air, and having thus become less soluble, more of it will be obtained. The same thing takes place, as regards fresh plants, if the distillation be commenced with cold water, the oxygen contained in the water combines with the volatile oil, alters it, and renders it insoluble, consequently it separates; but, on the contrary, if boiling water be used at the commencement, or what amounts to the same thing, if the fresh plants be subjected to the action of steam, the volatile oil is not altered, and it is completely dissolved in the water which distils over.

For the same reason, those volatile oils which are the most readily alterable, will afford the weakest distilled waters and *vice versa*; thus the turbid appearance of cinnamon, clove and mint waters, indicates that the volatile oil is imperfectly dissolved in them, whilst the clearness of rose water, and its powerful odour, evidently prove that it contains much volatile oil in solution. In fact the volatile oil of roses is one of the least alterable of this class of bodies.

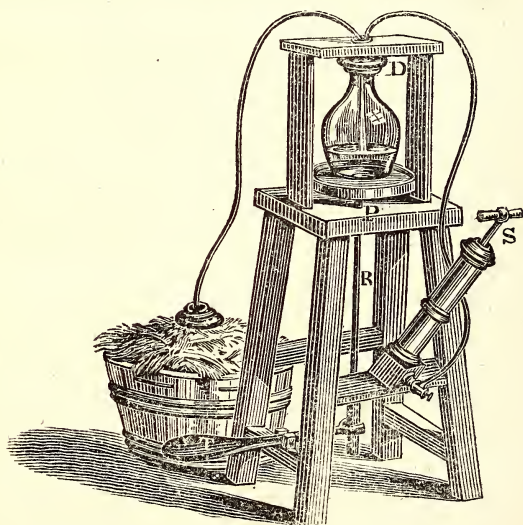
Hence, it is evident, that the mode of distillation, the fresh or dry state of the plants, the quantity and temperature of the water, are all of consequence in the preparation of distilled waters and volatile oils, as they are capable of exercising much influence on the quality and quantity of the products.

Another deduction from the opinion above stated is, that the difference of colour, weight and viscosity presented by oils from foreign substances, may be the result of their alteration, and that these oils prepared from fresh plants would probably possess qualities differing from those usually as-

cribed to them. For the same reason it may be possible to obtain the highly volatile oils by distilling the fixed oils impregnated with them, in vacuo, and without the addition of water; finally, it may be questioned whether the volatile oils are not always the result of the alteration of more subtle principles wholly unknown to us, which are characterized by their great solubility in water.

Journ. de Pharm. March, 1832.

ART. LX.—*Apparatus for transferring a liquid from a cask or boy to bottles, especially useful in the case of sulphuric acid, the decanting of which is always more or less dangerous to the manipulator, especially as detached globules may reach the eyes.* By ROBERT HARE, M. D., Professor of Chemistry in the University of Pennsylvania.



By means of a treadle T, the rod R, and platform P, the bottle is, by the foot pressed against a brass disk D, coated with gum elastic. In the centre of this disk are two holes,

one of which receives a leaden tube communicating with an exhausting syringe S, while into the other hole another tube is soldered, which extends to the bottom of an adjoining carboy of sulphuric acid. By means of the syringe, the bottle being exhausted, the contents of the carboy are forced into it by atmospheric pressure.

The gum elastic being stretched over the disk, is secured by a clasp which is fastened round the periphery by a screw.

This apparatus may be employed to raise liquors into a bar room from casks in a cellar, with this advantage over the pump now used for that purpose—that the liquor does not pass through a pump. It has only to come into contact with a pipe of from one-fourth to three-eighths of an inch in bore.

The attachment to the cask is easily made by a gallows screw soldered to the nozzle of a cock, or simply to a ferule which may be driven into a cork hole, punching the cork before it.

The foaming of fermented liquors would be promoted by the exhaustion, lessening, for a time, the atmospheric pressure on the carbonic acid.

Journ. Frank. Inst. Oct. 1833.

ART. LXI.—*Remarks on the Memoir on Ipomæa jalapa*, by D. B. SMITH, (*Jour. Phil. Col. Pharm.* vol. ii. p. 22.) By N. J. B. G. GUIBOUT.

MR. SMITH fully proves that the *Ipomæa macrorhiza*, Mx., which is also the *Convolvulus jalapa*, Linné and Desfontaines, does not produce the true jalap, but I think that he is mistaken in supposing that this plant produces the mechoacan, for, independently of other reasons, which will be hereafter adduced, if, as is remarked by Mr. Smith, the *I. macrorhiza*, whose root sometimes weighs 50 or 60 pounds, cannot produce the jalap of commerce, which never attains this size, it is evident that this plant does not afford the mechoacan, which is generally smaller than jalap.

According to the quotation of Mr. Smith, from the American Dispensatory, the first author who described the jalap was Monardes, who in his "History of Drugs brought from America," published in 1570, "pointed out the difference between jalap and mechoacan, and gave a clear and well defined description of these two roots." We might expect from this to find a good description of jalap in the work of Monardes, but this root is not even named in it, and we only find an imperfect account of three species of mechoacan:—

1. *Mechoacan*. A root found twenty years ago in the province of Mechoacan, (now Valladolid,) situated eighty miles from Mexico. The plant produces many flexible branches, which climb up poles or trelices, and cover them with their multiplied convolutions; the leaves are rounded, terminated in a point, petiolate, large, fibrous, and so thin that they appear to have no juice. The fruit is about the size of a dry coriander seed, collected in bunches; the root is thick, resembling that of bryony, so that many persons have thought these two plants to be identical, or at least closely allied; but they differ greatly as the root of bryony is very acrid, whilst the mechoacan is insipid.

2. *Mechoacan alterum*. They also bring us another mechoacan, which grows in the vicinity of Nicaragua and Quito, where it is carefully cultivated, and is much used on account of its admirable effects, which are far superior to that usually brought from New Spain. The flower resembles that of an orange, but is formed of five much larger petals; the fruit is the size of a filbert, having a thin, whitish envelope, and divided internally into two cells, each of which contains two seeds of the size of a small pea, which are black when ripe, and grow readily when planted in a light soil.

3. *Mechoacan sylvestris*. They also bring us from the promontory of Dona Helena, in the province of Nicaragua, another kind of wild mechoacan, which excites violent symptoms, as vomiting, colics and diarrhœa, on which account this mechoacan passes for a scammony, but no person has ever ventured to use it a second time. It resembles the other kind

in its leaves, its stems and root, but is smaller in all its parts, and its root has some acridity.

These last characters may, it is true, belong to jalap, but the first author who speaks of this root in a positive manner is Caspar Bauhin, who describes it in his *Prodromus Theatri Botanici*, published in 1620, under the name of *Bryonia mechoacana nigricans*, which appellation applies erroneously to the mechoacan, whilst it appertains to jalap, as is evident from the following description of Bauhin:—

Byronia mechoacana nigricans.—Root similar to mechoacan, but covered with a blackish bark, reddish within, round, cut into pieces of the size and form of a child's top, brought from the West Indies about eleven years since, (in 1609,) under the name of *chelapa* or *celapa*. The inhabitants of Alexandria and Marseilles call it *jalap* or *gelapo*, and it is regarded by the Marseillais as a sort of *black* or *male mechoacan*.

These observations on the memoir of Mr. Smith are trifling, but what I wish to impress is, that it is in fact owing to him that hereafter we ought never to confound the true jalap plant with the *I. macrorhiza* of Michaux, (*Convolvulus jalapa*, L.) for Dr. Coxe himself appears to believe in the identity of the two species, and has called the plant of the true jalap *Ipomœa jalapa*, *vel macrorhiza*, whilst the only name it should bear is the first of these.*

At the close of his memoir, Mr. Smith describes succinctly a fusiform and fibrous root, which appears to be as common in the American shops as in those of France, where it is known under the name of *Jalap leger*, (light jalap,) and is identical with that sent from Mexico to M. Chevallier by M. Ledanois, under the name of *male jalap*. I think that neither of these names are appropriate, as the latter is absurd, and as regards the former, we often find the true jalap lighter and less resinous than this pretended light jalap. The best method of designating these would be to call the true jalap *tuberous jalap*, and the other *fusiform jalap*, as their differential cha-

* Mr. Guibourt is mistaken; Dr. Coxe did not believe in the identity of the species, but intended that of *macrorhiza* as a synonyme.

racter resides in their form, which depends on a particular organization, which is the cause of the other differences between them, as the compact and conchoidal fracture of the tuberous jalap, and the long longitudinal fibres of the fusiform kind.

Since Mr. Ledanois sent the root of the fusiform jalap, he has transmitted to Academy of Sciences through M. de Humboldt, a specimen of the plant producing it, as well as of another plant which appears to be the true jalap, as may be deduced from the following extract of a report made to the Academy by M. Desfontaines:—

“These two species of jalap belong to the genus *Convolvulus*, their leaves are cordate; those of the male jalap are villous; those of the other are smooth, and terminated by a long point. Their corolla is of the form and size of that of the common bird weed, (*Convolvulus sepium*.) It is of a beautiful rose colour. These two plants differ from the common jalap cultivated in the *Jardin du Roi*.”

It appears evident to me, that the plant with smooth acuminate leaves, and rose coloured flowers is the true jalap, *I. jalapa*, (Coxe,) Smith. It is very probable however that the male or fusiform jalap, only differs from the former in the form of its leaves, which are villous and not longly acuminate. (The flowers appear the same.) Finally, there is no doubt, from the testimony of M. Desfontaines himself, that these two plants differ from the *Convolvulus jalapa*, L. or *Ipomæa macrorhiza*, Mx., the root of which is unknown in commerce, and is not the mechoacan.

This root has always appeared in the same form, in circular slices of from one to three inches in diameter at the most, or in elongated pieces, which apparently are portions of a fusiform root. It is white and farinaceous internally, inodorous, with a taste which is at first very faint, but afterwards slightly acid. It is always deprived of its bark, of which some yellowish traces only are perceptible; finally, what completely distinguishes the mechoacan from the two species of jalap, from the root of the *Ipomæa macrorhiza*, and from the decorticated tubers of the *Arum dracunculus* which it

closely resembles, are the brown spots, and the vestiges of ligneous radicles, which must be very numerous on the surfaces of the root, as no part of the bark, however small it may be, does not afford indications of one or more of them. Any plant whose root does not present this character, is not the mechoacan, and it may be assumed that it is as yet unknown.

Journ. de Chim. Med. Sept. 1833.

ART. LXII. *On Oxalhydric Acid.* By M. GUERIN.

Properties. It has the consistence of a very pure syrup, is colourless, and tastes much like oxalic acid. Its density is 1416 at 75° F. It is soluble in all proportions in water and alcohol. It is very slightly soluble in cold or boiling ether; is very deliquescent; it precipitates lime, strontian and barytes water. These precipitates are dissolved by a slight excess of the acid. This character is also common to tartaric acid, from which it is distinguished by its not precipitating a concentrated solution of potassa, or a salt of that base; it, however, cannot be confounded with the malic acid of vegetables, which does not afford a precipitate with these salts. It precipitates the subacetate, the acetate, and the nitrate of silver in colourless flocculæ, and forms well characterized salts with salifiable bases.

Hydrated oxalhydric acid, permitted to stand in a glass stoppered bottle for a month, deposited crystals which had all the properties of the syrup-like acid. One part of this acid added to three parts of nitric acid, afforded in a month's time fine crystals of oxalic acid. One part of oxalhydric acid mixed with one part of water, and two parts of oxide of manganese, and two and a half parts of concentrated sulphuric acid, diluted with two parts of water, afforded formic acid.

Preparation. One part of gum arabic is to be mixed with two parts of nitric acid of 1339, diluted with half its weight of water, in a retort of four times the volume of the mixture, and provided with a tubulated receiver; a slight

heat is to be applied, till all the gum is dissolved; as soon as nitrous vapours appear, the fire is to be put out; a great disengagement of deutoxide of azote takes place; when this has ceased, the liquid is to be kept slowly boiling for an hour; then diluted with four times its weight of water, ammonia is to be added till it is perfectly neutralized, and afterwards a small quantity of a solution of nitrate of lime, so as to precipitate the oxalic acid, which almost always is found in a small proportion. The reddish yellow liquid having been filtered is to be precipitated by acetate of lead. This precipitate is to be separated by means of a filter, and washed until the fluid is not blackened by sulphuretted hydrogen. The precipitate is then to be decomposed by means of this gas, or by sulphuric acid diluted with six times its weight of water.

The acid thus obtained is of a yellow colour; it is to be evaporated over a gentle fire, and when sufficiently concentrated is to be neutralized with ammonia, then evaporated till it begins to crystallize; the crystals which form are of a very dark brown colour; they are to be treated with animal charcoal.

If in this preparation the gum arabic be replaced by sugar or starch, the same results are obtained. This acid affords crystalline salts with most of the alkalies and alkaline earths, if the acid be in excess, but the perfectly neutral salts it forms with these bases, are in general unsusceptible of assuming a regular shape.

Journ. de Chim. Med.

MISCELLANY.

Arrow Root.—It is evident that pure fecula being chemically identical in all vegetables, must be identical in its medical properties. Hence it savours of charlatanism to insist on prescribing to a patient a foreign and expensive article, when a native and cheap substitute, possessed of the same properties, can always be procured. Thus, both arrow root and sago can be and are perfectly imitated by potatoe starch; so much so, that Mr. Raspail is inclined to believe that most of the sago of commerce is thus made.

Raspail. Chim. Organ.

Cotton Lint and Bandages.—It has been observed that cotton could not be advantageously substituted for linen, in the preparation of lint, and some authors have asserted that this was owing to the fibres of the cotton being triangular, and thus becoming a source of irritation. This ridiculous assertion, has not the slightest foundation in fact. When viewed with the microscope, it will be found that the fibres of cotton are tubular, and somewhat flattened by the process of drying. The true explanation why cotton is not as good for lint &c. as linen, is that the fibres of flax are hollow tubes open at their extremities, whilst those of cotton are closed, hence the former are far better calculated to absorb any liquid than the latter.

Ibid.

Kinic Acid.—According to an analysis of this acid by M. Baup, it appears that dry kinic acid is formed of 15 atoms of carbon, 20 of hydrogen and 10 of oxygen, or in the 100 parts, 50 of carbon, and 50 of hydrogen and oxygen in the same proportions as in water. This composition, like that given by Prout for ligneous fibre, is another example of isomery.

Journ. de Pharm. May, 1833.

Crystallization of certain Metallic Oxides.—Many of the metals as well as some of their oxides can be crystallized by well known chemical means, or by the aid of the electric forces; but the number of these crystallizations is limited, especially as regards anhydrous oxides. M. Becquerel conceived the idea of dissolving these oxides in the peroxide of potassium, thinking that this body, from its degree of oxigenation, would not possess the faculty of forming as intimate combinations with

them, as takes place with potassa, which is a more energetic base. It is well known, that peroxide of potassium is formed, whenever potassa is kept in a state of fusion, exposed to the action of the air. When the mass is cooled, and moistened with water, there is a disengagement of oxygen. If a metallic oxide be mixed with the potash, the two bodies act on each other, and a union takes place, and when this mass is cooled and treated with water, there is a disengagement of oxygen, and precipitation of the oxide in flocculæ, mixed with small crystals. If the oxide be dissolved in the potassa, protected from the action of the air, no crystals are formed; hence their formation is intimately connected with that of the peroxide of potassium. The oxides of copper, lead, cobalt and zinc, have been obtained in a crystallized form in this manner. *Ibid.*

Indelible Ink.—One pound of pure subcarbonate of soda is to be dissolved in ten pounds of boiling water, and four ounces of resin and eight pounds of wax cut into small pieces, are to be added to the solution, which is to be well stirred. Thirty ounces of this soap are to be dissolved in thirty pounds of boiling water, and filtered, then add two pounds of shellac dissolved and an ounce and a half of fish glue, mixed with one ounce of common salt. The shellac dissolves very readily; if, however, the soap is not sufficiently alkaline, add a small quantity of soda to hasten this solution which forms the liquid base of the ink. To give it a black colour, take one pound of grape charcoal, three ounces of animal charcoal, made with wool or gelatine, and an ounce and a half of charcoal sugar, triturate them well with a little indigo, when the powder is perfectly impalpable, mix it with the liquid, which is to be decanted from the dregs. This ink has all the necessary qualities. The fish glue and salt may be replaced by an equal quantity of gum arabic. The beauty of the ink depends on the fineness of the powders. It is unalterable in the air, and neither chlorine, nitric acid, diluted sulphuric acid, oxalic acid, potash, soda, boiling water &c. have effect on it.

Journ. de Chim. Med.

Cusparine.—M. Saladin has obtained a new principle from the Angustura bark by the following process. An alcoholic tincture of the Angustura, made in the proportions of 7 to 20 is permitted to evaporate slowly at a very low temperature; in a few days a kind of incipient mammillary crystallization will be perceptible in a magma of colouring and extractive matters. These crystals are to be carefully removed, drained, expressed and washed with a little water, when they appear in a regular but not very distinct form. By repeated treatment with alcohol of 8349, and finally agitating them with ether, and a little recently prepared hydrate of lead, they may be freed from all colouring and fatty matters, and on being crystallized at a temperature of 20° F. they may be obtained in

groups of tetrahedral prisms. Their solution in alcohol is bitter and somewhat pungent to the taste. They have no acid or basic reaction. The properties of this substance appear to be analogous to quinine, salicine &c. By the process above mentioned the quantity of cusparine obtained is equal to 13-1000 of the bark employed. *Ibid.*

Iodic Acid.—M. Grosourdy, gives the following process for obtaining this acid:—A current of chlorine is to be passed through a small Wolf's apparatus, in the bottles of which is pulverized iodine suspended in a small quantity of water. When the iodine is converted into a perchloride, the disengagement of the chlorine is to be stopped, and water poured into the brown liquid in the bottles, till the colour is destroyed, at which time all the perchloride has been converted into iodic and hydrochloric acids. The liquid is now to be saturated with pure carbonate of barytes, in fine powder, and very gradually added, till it creates no effervescence. There is now a formation of iodate of barytes and chloride of barium. The first being little soluble in water, and the latter readily so, they may be separated by repeated washings with cold water. The pure iodate is then to be treated with sulphuric acid diluted with four parts of water, taking care to use no excess. The whole is filtered, and the product evaporated and crystallized. *Ibid.*

Prussian Blue.—The presence of potassium in Prussian blue, which was first observed by Proust, has lately been a subject of dispute among chemists. Berzelius has given some interesting observations on it. On washing Prussian blue, it obstinately retains the cyanodide of potassium. Berzelius has found, however, that by perseverance in the washings, it may be entirely removed. Neither hot nor cold water decomposes Prussian blue, but on its being exposed for a long time to the combined action of air and water, a decomposition takes place at the expense of the air; the iron of the cyanodide oxidizes, and the cyanogen enters into other combinations; this operation, however, goes on very slowly. The fluid of these repeated washings of Prussian blue, contains no yellow ferro-cyanodide of potassium, the red cyanodide of Gmelin, only is in solution; hence, as a part of the iron is oxidated, the cyanogen forms a cyanodide which unites to that of potassium, and which is dissolved by the water; as this takes place at the expense of the air, it may be readily conceived that the process is a slow one.

The explanation of the presence of cyanodide of potassium in Prussian blue is to be found in an observation of Mosander's, who states that several of the ferro-cyanodides by being precipitated together, may unite and form triple combinations, but less permanent than the ferro-cyanodides which compose them. They are formed of one atom of cyanodide of iron, one of cyanodide of potassium, and one of cyanodide of barium, calcium or mag-

nesium, and may be considered as a double ferro-cyanodide of a positive base, or as a combination of two different ferro-cyanodides. Something similar takes place in the precipitation of Prussian blue by the ferro-cyanodide of potassium, if this latter salt be in excess, as soluble Prussian blue is formed, but which precipitates because it cannot dissolve in the water already saturated with other salts. This soluble blue appears to be composed of two atoms of ferro-cyanodide of potassium and three atoms of Prussian blue. This combination is not contained in Prussian blue as this latter is insoluble; when the salt of iron is in greater proportion than the ferro-cyanodide of potassium, there is a precipitate of a mixture of Prussian blue and an insoluble combination, which varies greatly in its composition, according to the excess of the ferruginous salt, the degree of concentration of the solution of the cyanodide of potassium, and its more or less prolonged contact with the salt of iron in excess. In washing the precipitate, the ferruginous salt is the first to dissolve; the water then begins to decompose the Prussian blue, the air and water cause the formation of oxide of iron, and at the same time there is a production of red cyanodide which dissolves, giving a yellow colour to the washings. The oxide of iron remains combined with the Prussian blue, forming a certain quantity of basic Prussian blue. *Journ. de Pharm.*

Gum Senegal.—Dr. Guillemin states that the best gum senegal is furnished by the *Acacia vereh*, and the most astringent *bablah* by the *Mimosa arabica*. *Ibid.*

Arrow Root.—Mr. J. M. Walsh, in a thesis sustained at the *Ecole de Pharmacie Paris*, gives the following account of the arrow root of commerce, and the means of detecting adulterations of it. Under the name of arrow root, the feculs of the tuberous roots of several monocotyledonous plants of the natural orders *Aroidæ* and *Scitamineæ*, are usually comprehended. Thus the *Maranta arundinacea*, the *M. Indica* and *Curcuma angustifolia*, all furnish a good article, as does also the *Tacca pinnatifida*. In commerce, arrow root is often falsified with rice, wheat or oat flour, frequently with potatoe starch, but still more with cassava flour. The farinas of rice, wheat, or oats, are distinguished from arrow root by the azoted principle contained in them, and by the ammoniacal products they furnish on distillation. But as both cassava and potatoe fecula are analogous to arrow root in composition, other distinctive characters become necessary. On examination, it has been found that potatoe starch is insoluble in cold water, whilst the farina of cassava, and more especially the true arrow root, dissolve in it. The jellies made with each of these substances and an equal proportion of boiling water, differ from each other in consistence; the least so being that of cassava, next the arrow root, and then the potatoe. The jelly of barley flour liquifies more slowly

than the above, whilst that of arrow root melts with great rapidity in the mouth. When arrow root is pressed with the finger, it retains the impression, and a crackling noise is produced; this is not the case with potatoe starch or the farina of the cerealia. Cassava flour preserves the impression of the finger like arrow root, but may be generally distinguished from it by its smell and a somewhat acrid taste. When examined before the microscope, arrow root presents isolated grains like those of the other feculas, but has two circular impressions instead of one. *Ibid.*

Adulterations.—M. Dubail gave an account to the Society of Pharmacy of Paris of an adulteration of oil of anise. Some he examined he found to be a mixture of 5 parts of oil of anise, 10 parts of soap and 85 parts of alcohol of 34°; the whole covered with a stratum of the pure oil of anise. He also examined another parcel made for winter sales, in which there were 20 parts of soap, to imitate the thickness which the oil of anise assumes in cold weather. The same gentleman also reported an adulteration of oil of roses, by means of a solution of gelatine covered with the genuine article. *Ibid.*

Action of Magnesia on Valerian.—M. Planche has found that calcined magnesia forms a real combination with the odorous principle of valerian, hence mixtures into which these two substances enter, will not present the smell of the valerian. This combination is destroyed by the addition of any of the strong acids. *Ibid.*

Cascarilla.—According to Mr. E. Dubail the cascarilla bark is sometimes adulterated with that of the *Croton suberosum*. This resembles the true article in external appearance. It is generally in large convoluted pieces, about as thick as the thumb, and from one to two feet long. It has a less bitter, less aromatic, but more mucilaginous taste; when it is burnt, it exhales a far less agreeable odour than cascarilla. *Ibid.*

Spirit of Wood.—In distilling wood vinegar, a remarkable product is obtained, having a great resemblance to spirits of wine. It is, however, very impure, being coloured by a substance analogous to pitch, and mixed with an empyreumatic oil, which is more volatile than the spirit itself. M. Liebig has discovered a mode of purifying it perfectly, by first rectifying it, and saturating the product with chloride of calcium. The empyreumatic oil separates and collects on the surface of the liquid, whence it is easily removed, when the remainder is again to be distilled in a water bath. The pure spirit of wood thus obtained, is colourless, has a penetrating ethereal smell, and a pungent, peppery taste; its specific gravity is 0.804. It burns with a blue flame of little brilliancy.

Ibid.

Salicine.—M. Duflos gives the following simple method of preparing salicine. The bark is to be exhausted of its soluble parts by three successive decoctions, the united products filtered and evaporated, till the liquid is three times as heavy as the bark employed; oxide of lead in fine powder is then to be added, and the mixture digested for twenty hours at a mild heat, taking care to stir it frequently, then filtered and evaporated to a syrupy consistence; the crystals that form are to be purified by solution in water and recrystallization. *Ibid.*

Strawberry Syrup.—According to M. Raymond, the method used by the confectioners of Paris for making this syrup affords an excellent article. They first form their syrup of sugar, and whilst boiling throw in the strawberries, keeping up the ebullition for five minutes, then remove the vessel from the fire and strain the syrup. *Ibid.*

Plant furnishing the Gum Bdellium.—The authors of the Flora of Senegambia have described this hitherto unknown plant. It is a shrub resembling the *Rhus oxycantha*, growing in sandy and arid situations in the interior of Senegal, flowering in March and April. It has been erected into a new genus *Heudelotia*—it belongs to octandria monogynia, and the natural order terebinthaceæ. *H. Africana*. Calyx one leaved, tubular, four-toothed, coloured; petals four, linear obtuse; stamina eight, four alternate longer than the petals and four shorter; style simple; drupe dry, fusiform, one celled; leaves trifoliate, folioles incised-dentate. The shrub is about eight to ten feet high, branched, spinose, with alternate leaves. Flowers are small, of a rose red colour, and collected in panicles. *Ibid.*

Manufacture of Chlorate of Potash. By M. VEE.—Into each of four earthen vases is to be introduced eight kilog. (20 lbs.) of manganese, in pieces about the size of a hazel nut. These vases are to be placed on a sand bath of a furnace, having four separate fire places. A leaden tube is to be adapted to each vase, and is to pass into a deep but narrow receiver, containing four killog. (10 lbs.) of quick lime, suspended in 40 litres (80 pints) of water. Into each vase is to be poured 25 kilog. (63 lbs.) of hydrochloric acid, the tubes are to be adjusted, and the receivers covered with a sheet of lead, luted with lime, and loaded with a weight to prevent the escape of the gas. When the action begins to slacken, the fire is to be lighted, and the contents of the receivers stirred to prevent the deposition of the lime.

At the close of the operation, if manganese of a good quality has been used, solutions of chloride of lime of 12° or 13° will be obtained. The contents of the receiver are permitted to settle, the clear liquid poured off, and the deposit which is formed of a small excess of lime, and insoluble subchloride of lime, is drained and washed.

All the liquids are to be united, and four kilog. (10 lbs.) of slackened lime added to them, and a fresh current of chlorine passed through the mixture; this chlorine is to be made as before, except that as in the first operation there was an excess of manganese, the residue is to be washed and again used. This second operation ought to give a solution of chloride of lime of 18° or 20° , which is to undergo the same train of processes as at first.

When a concentrated solution of chloride of lime is thus obtained, it is to be poured into a leaden boiler, and a brisk fire kept up under it; when it begins to heat, dissolve in it a sufficient quantity of chloride of potassium to raise the density of the fluid 3° or 4° B; when it is to evaporate as speedily as possible to 30° or 31° B. It must be attentively watched during the first part of the ebullition, as there is sometimes so great a disengagement of oxygen, as to throw out a considerable portion of the liquid; at other times this disengagement is scarcely perceptible.

When sufficiently concentrated, the solution is to be put aside to crystallize in earthen vessels, in as cold a situation as possible, when there will be a deposit of a mixture of chlorate of potash and chloride of potassium, differing in proportion according to the operation. The mother waters are again to be evaporated to 36° , when they will afford an additional quantity of chloride of potassium, after which they contain but little except hydrochlorate of lime, but retain a strong smell of chlorine.

The impure salts arising from the first crystallization, are to be dissolved, and the solution making 15° or 16° , filtered, when pure chlorate of potash will be obtained; evaporated to 18° an additional quantity is sometimes the result, but generally it is mixed with a large proportion of chloride of potassium; after this last concentration, the mother waters contain scarcely any thing but this latter, and are to be evaporated to obtain it.

The products of two operations, requiring 112 kilog. (270 lbs.) manganese, and 400 kilog. (1000 lbs.) hydrochloric acid, will be from 9 to 17 kilog. (22 to 42 lbs.) of chlorate of potash. *Journ. de Chim. Med.*

Acids in Nux vomica.—Mr. Corriol has discovered a new acid in *Nux vomica* differing from the Igásuric acid of Pelletier and Caventou. This acid exists in a state of combination with lime, with which it forms a very soluble salt, which crystallizes in a granular mass, when the aqueous extract of *Nux vomica* is treated with alcohol and distilled. This saline mass should be purified as much as possible by pressure, and by repeated solutions and crystallizations in water and alcohol. When the salt is perfectly white, it is to be dissolved in water and decomposed by means of oxalic acid. The free acid thus obtained may be concentrated to a syrupy consistence in vacuo, without crystallizing. When dried it is volatile, and forms more or less soluble salts with the salifiable bases,

and gives rise to crystallizable compounds with the vegetable alkalies. When it is distilled in a bath of sulphuric acid, it becomes concentrated and assumes the consistence of butter, or sublimes in well defined crystals on the sides of the retort. The concrete acid is soluble in boiling water, alcohol and ether, and from which it crystallizes on cooling. Mr. Corriol also discovered another acid in this substance, which he proposes to examine more particularly.—(*Journ. de Pharm. March.*) In a subsequent number of the same work Mr. Corriol states that he has verified the identity of this acid with the Zumic, to which he assigns characters differing from those described by Braconnot; the inaccuracy of whose account had misled him.

Journ. de Pharm.

Manganesiate of Potash.—M. Wohler gives the following mode of obtaining this salt:—Melt chlorate of potash in a platina crucible, over a spirit lamp. Dissolve in it a piece of pure potash and peroxide of manganese in powder. A beautiful green solution is formed, containing the green manganesiate of potash and chloride of potassium. The mass is to be dissolved in boiling water, when the green colour changes to a brilliant purple, the manganesiate being transformed into a per-manganesiate. Decant and evaporate. Small, opaque, black crystals of the per-manganesiate, having greenish metallic lustre, will be obtained. This salt is isomorphous with the perchlorate, and they may be crystallized together in all proportions, affording salts of great beauty, and of very different shades of colour.

Ibid.

Crystallization of Iron.—Mr. Wohler states that iron bars of two inches in thickness, subjected to a white heat for a great length of time in a blast furnace, presented a brilliant and lamellar texture on being broken, although they had originally been of a fine grain. On breaking them, Mr. Wohler was able to separate perfect cubes, several of which were an inch square. These cubes had a rectangular cleavage, as perfect as that of galena, which mineral they closely resembled. This crystallization is the more remarkable, as the iron had not melted. Iron presents another crystalline form, which is sometimes to be observed in the cavities which occur in large masses of melted iron: These crystals are either octohædrons, or portions of octohædrons.

Journ. de Pharm. May, 1833.

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